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4959 INPUT/OUTPUT EXPANSION UNIT

PURPOSE

Provides enclosure and power for additional S/I features.

MODELS

Model A A00: 14 I/O feature locations, a full-width unit. Designed for mounting on support rails (fixed) in a 4997 or EIA standard 19-inch rack enclosure.

Limitations: A maximum of 24 data set and/or asynchronous local cables, or 40 of (smaller diameter) RS-422, current loop, and/or TTY cables. A proportional mix is acceptable, such as 12 data set cables and 20 RS-422 cables.

Prerequisites: Processor Unit 4952, 4953 (discontinued), 4954, 4955, 4656. For 4952, 4953 (discontinued) 4954, 4955 and 4956, Channel Repower #1565 is always required in the processor to attach a 4959. All 4959s attached to another 4959 or 4965 require #1565 in the preceding 4959 or 4965. All integrated communications features (except #2080 when using local connection) require Communications Power (#2010) if mounted in a 4953 B or D, 4955 A, B, C, or D, or 4959

HIGHLIGHTS

Provides space for up to 14 I/O attachment features. See "Specification Table". The Programmable Two-Channel Switch or the Two-Channel Switch #7900 enables switching of all features in this unit (and in 4959s connected to this unit) between two processors.

Publications: "IBM Series/1 4959 Input/Output Expansion Unit Description" (GA34-0056).

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture. Specify codes #2XXX, #8XXX and #9XXX, apply to plant orders only -- do not use on MES orders.

- **Voltage Change:** For 4959 Input/Output Expansion Units with a serial number greater than 22500, MES 6840342 is field installable to change any low voltage specify code to any high-voltage specify code.

- **Power (AC, 1-phase):** With 1.8m (6 ft) cord.

50 HZ	60 HZ
100V #2804	100V #2730
110V #2805	110V #2822
123.5V #2811	115V #9901
200V #2806	120V #9911
230V #2821	127V #2823
235V #2814	200V #2732
240V #2801	208V #9902
	220V #2803
	230V #9904
	240V #9914

- **Extended I/O Channel Cable:**

For initial system orders including 4997 Rack Enclosures, IBM will locate machines and supply cables as required. For additions to existing systems or for machines located in customer racks, extended cables must be specified where needed.

- **Sequence Numbers:**

For multiple processor configurations, each processor has been assigned a sequence number, #93BB. In a system

where a 4959 may be connected only to a single processor (private I/O), the 4959 will have the same sequence number #93BB as the processor to which it is connected. Alternatively, a 4959 may be attached to two processors through a Programmable Two-Channel Switch (#7777) or a Two-Channel Switch (#7900). When a 4959 is connected in this manner (a 'Y' configuration) the I/O devices are shared between the two processors. Specify both processor sequence numbers for 4959s connected this way.

In the special case where there are two #7777s or two #7900s interconnecting four machines, only one #93BB is specified for each 4959 containing the shared I/O. This is the #93BB associated with the processor for which primary or normal attachment is desired. In addition, for each 4959 containing shared I/O and not containing a #7777 or a #7900, specify #9450 (Extension of Switched I/O Channel).

- **Power Cord Codes:**

(Canada only) > #2744 <
(Japan only) > #2747 <

- **Machine Nomenclature:**

English US	#2750	Japanese	
French	#2928	Katakana	#2926
German	#2929	Spanish	#2931
Italian	#2932		

SPECIAL FEATURES

NON-COMMUNICATIONS FEATURES

4993 S/I - S/370 Channel Attachment (#1200): In conjunction with the 4993 Termination Enclosure, this attachment provides a high-speed data transfer capability between a S/I and the S/370 (mdls 135 through 168), 3031, 3032, 3033, 3081, 3083, 3090, or 4331, 4341 processors. It occupies 32 device addresses on the S/370 channel and a single device address on the S/I. Capable of transferring data under joint consent between the S/370 and the S/I using a subset of the 3272 control unit commands. The attachment may operate with a selector or block multiplexer channel. Allows IPL of the S/I from the host S/370. Field Installation: Yes. Prerequisites: One 4993 mdl 1 S/I - S/370 Termination Enclosure. See M4993 pages for further details.

Specify:

#9520 Remote IPL
#953X To specify the S/370 Control Unit channel code, take the second hex digit of the 370 Control Unit Channel address and determine X as follows:

2nd Digit
S/370 Address

0	X = 1
2	X = 2
4	X = 3
6	X = 4
8	X = 5
A	X = 6
C	X = 7
E	X = 8

Note: The second digit of the S/370 address must be even and the third digit must be zero. See description of 4993 Terminal Enclosure for further details.

4966 Diskette Magazine Unit Attachment (#1205): Provides for the attachment to S/1 of one 4966 Diskette Magazine Unit. Specify: #9521 for Primary IPL -- #9522 for Alternate IPL. Note: When diskette function is included in a S/1 configuration, IPL from such a device is required for loading diagnostics. Field Installation: Yes.

5250 Information Display System Attachment (#1210): (No longer Available) A 2-card feature requiring contiguous I/O feature positions. Provides for the attachment to S/1 of the following machines and features. See M5251, 5256, and 5291 pages for details.

- 5251 mdl 11 Display Stations with options Keylock #4655, Magnetic Stripe Reader #4910, Cable-Thru #2680, Multinational Character Set #4905, and Display Screen Filter #3225, #3226. Keyboard #4600 must be selected.
- 5256 mdl 1, 2, and 3 Printers with options Forms Stand #4450, Audible Alarm #1470, Cable-Thru (#2680), Multinational Character Set #9470,
- 5291 mdl 1 Display Station.

#1210 provides four ports for attachment of the 5250 Information Display System Attachment Cable #5760, which provides for connection of customer-supplied twinaxial cable. A maximum of seven workstations in any combination may be attached to a single port by using the Cable-Thru #2680 on the 5251 or 5256s involved. Cable-Thru #2680 must be provided on all but the last unit attached to any single port. Cable-Thru is a standard feature on the 5291 Display Station. A total of eight workstations may be attached to a single #1210. 5251, 5256 and 5291s each count as one workstation. The maximum length of twinaxial cable to each #1210 port is 1,524m (5,000 ft). See #5760 in "Accessories" below. Also, "IBM Series/1 Customer Site Preparation Manual", (GA34-0050), for additional cabling information. Field Installation: Yes.

Specify: 5251 Keyboards Supported:

Brazilian #2975	Japanese
Canadian French #2977	English #2955
English US #2956	Japanese
French AZERTY #2964	Katakana #2973
French QWERTY #2970	Portuguese #2959
German QWERTZ #2957	Spanish #2960
Internat'l #2950	Spanish
Italian #2968	Speaking #2961

5256 CHARACTER SETS SUPPORTED:

Brazilian #2975	Japanese
Canadian French #2977	Katakana #2973
English US #2956	Portuguese #2959
French #2964	Spanish #2960
German #2957	Spanish
Internat'l #2950	Speaking #2961
Italian #2968	
Japanese English #2955	

Magnetic Tape Subsystem Attachment (#1215): Provides for the attachment of one primary 4969 Magnetic Tape Unit and up to three 4969 expansion units, to S/1. Expansion units are connected to the primary unit in a serial cable arrangement. The subsystem sequence number #926X is used to associate the attachment feature with the 4969 tape units making up the subsystem. Field Installation: Yes.

Specify: Subsystem Sequence Number:

#926X - (Where X = 1 through 9)

IPL:

#9523 - Primary IPL first drive
#9524 - Alternate IPL first drive
#9525 - Primary IPL second drive
#9526 - Alternate IPL second drive

4968 Autoload Streaming Magnetic Tape Unit Attachment (#1220): Provides for the attachment of one 4968 to S/1. Specify: #9157 for Alternate IPL only.

Multidrop Workstation Attachment (#1250): Provides for attachment of up to eight 4980 Display Stations. For cabling flexibility, four ports are available to which zero to eight displays may be attached (not to exceed a total of eight displays on each attachment) using twinaxial cabling and the cable-thru feature of the 4980. Maximum total cable length of each port is 1,219m (4,000 ft). Outdoor cabling is not supported. A six meter (20 foot) Attachment Cable #5780, may be used to attach to the first display on each port (one #5780 used per port) or, along with twinaxial cable-to-cable connector (B/M 7362230) to attach to cabling with twinaxial connectors. Berg Connector Kit may be used for direct attachment of twinaxial cabling. Refer to "Accessories" for information on shielded twisted-pair cabling.

Multifunction Attachment (#1310): The Multifunction Attachment #1310 available on all mdls of the S/1 processor family provides for the attachment of four devices utilizing only one S/1 I/O feature location. All four of the attachment addresses provide for local attachment up to 1,219m (4,000 ft) of the 3101 Display Terminal, 3161/3163 ASCII Display Station, or the 4975 Printer (cable #5770 or equivalent). The 3101-23 and 4975 can be attached using shielded twisted-pair cabling (feature #5790 required -- see "Accessories"). The first address can be configured to provide for a local attachment or a remote (via common carrier communications facilities) attachment of the 3101 Display Terminal, 3161/3163 ASCII Display Station, or a 4975 Printer, or a system/terminal utilizing Binary Synchronous Communications (BSC). The remaining addresses are direct connect only. Limitations: The Multifunction Attachment aggregate capacity is sensitive to the type of devices attached as well as application utilization of the devices. See "Multifunction Attachment Feature Description" (GA34-0144), for specific configuration information. The customer is responsible for establishing equivalency when utilizing machines other than a 3101, 3161, 3163 or 4975. It should be recognized that the 3101, 3161, 3163, and 4975 are customer setup devices, while the Multifunction Attachment is installed by IBM. No more than 24 communication cables (four per #1310), of any mixture can terminate in a S/1 Processor, 4965 Storage and I/O Expansion Unit, or a 4959 Input/Output Expansion Unit. For information on prerequisites and specify codes see "Integrated Communication Feature Function Specify Codes, Limitations, and Prerequisites". Field Installation: Yes.

Specify: The Multifunction Attachment requires a minimum of one and a maximum of six specify codes for each attachment card ordered. These codes provide information for the jumper selection at time of manufacture as well as information for installation by the CSR.

- Specification of Device Attachment (up to four specifications):

Where X = 0	First Address
	(RS-232-C/RS-422-A)
1	Second Address (RS-422-A)
	(RS-422-A)
2	Third Address
	(RS-422-A)
3	Fourth Address
	(RS-422-A)

Specify Code

MACHINES

Description	First #1310	Second #1310	Third #1310	Fourth #1310
3101, 3161 or 3163				
Display				
Terminal Att'd	#972X	#973X	#974X	#975X
4975 Printer Att'd	#976X	#977X	#978X	#979X
OEM Device Att'd	#980X	#981X	#982X	#983X
Binary Sync Comm (BSC-PTP)	#9840	#9850	#9860	#9870
BSC Tributary (BSC-MPT)	#9530	#9540	#9550	#9560
Description	Fifth #1310	Sixth #1310	Seventh #1310	Eighth #1310
3101, 3161 or 3163				
Display				
Terminal Att'd	#932X	#933X	#934X	#935X
4975 Printer Att'd	#936X	#937X	#938X	#939X
OEM Device Att'd	#940X	#941X	#942X	#943X
Binary Sync Comm (BSC-PTP)	#9440	#9270	#9280	#9290
BSC Tributary (BSC-MPT)	#9460	#9470	#9480	#9490

- Specification of First Address Characteristics (one specify required):

	Specify Code			
Description	First #1310	Second #1310	Third #1310	Fourth #1310
Local Interface (RS-422-A)	#9841	#9851	#9861	#9871
Leased line, FD or Local RS-232	#9842	#9852	#9862	#9872
Leased line, HD or Local RS-232	#9843	#9853	#9863	#9873
Sw line, FD, no answer tone	#9844	#9854	#9864	#9874
Sw line, HD, no answer tone	#9845	#9855	#9865	#9875
Sw line, FD, answer tone	#9846	#9856	#9866	#9876
Sw line, HD, answer tone	#9847	#9857	#9867	#9877
Description	Fifth #1310	Sixth #1310	Seventh #1310	Eighth #1310
Local Interface (RS-422-A)	#9441	#9271	#9281	#9291
Leased line, FD or Local RS-232	#9442	#9272	#9282	#9292
Leased line, HD or Local RS-232	#9443	#9273	#9283	#9293
Sw line, FD, no answer tone	#9444	#9274	#9284	#9294
Sw line, HD, no answer tone	#9445	#9275	#9285	#9295
Sw line, FD, answer tone	#9446	#9276	#9286	#9296
Sw line, HD, answer tone	#9447	#9277	#9287	#9297

- Specification of First Address - IPL Capability (one specify required):

Specify Codes			
First	Second	Third	Fourth

MACHINES

Description	#1310	#1310	#1310	#1310
IPL - Requires BSC capability	#9122	#9124	#9126	#9128
No IPL capability required	#9123	#9125	#9127	#9129
	Fifth	Sixth	Seventh	Eighth
Description	#1310	#1310	#1310	#1310
IPL - Requires BSC capability	#9462	#9464	#9466	#9468
No IPL capability required	#9463	#9465	#9467	#9469

Example: A S/1 with one Multifunction Attachment that will support two 3101, 3161, or 3163 Displays and two 4975 mdl 02L. The specify codes for this adapter would be:

#9720 3101, 3161, or 3163 on Address 0
#9721 3101, 3161, or 3163 on Address 1
#9762 4975 on Address 2
#9763 4975 on Address 3
#9841 Local Interface used on Address 0
#9123 No IPL capability

Integrated Digital Input/Output Non-Isolated (#1560): Provides 32 points of digital input or process interrupt and 32 points of digital output. Non-isolated, TTL compatible, and high level. Direct program control using four device addresses. Each 16 point group has one external sync and one ready line. See "Accessories" for optional Customer Access Panel (#1590). Field Installation: Yes.

Channel Repower (#1565): Resides in preceding unit and provides channel repower for 4959 and 4965 I/O Expansion Units. Field Installation: Yes. Prerequisites: Required for first and all subsequent 4959s attached to 4952, 4953, 4954, 4955, or 4956 processors. A 4956 attached to a 4959 requires #1565 in the 4959.

4962 Disk Storage Unit Attachment (#3580): Provides for S/1 attachment to the 4962-1, 1F, or 3 Disk Storage Unit or the disk portion of a 4962-2, 2F, or 4 Disk Storage Unit. Field Installation: Yes. Prerequisites: #3851 also required for attachment of diskette portion of 4962-2, 2F, or 4 Disk Storage Unit.

Specify:

IPL:

#9133 - Primary IPL device
#9134 - Alternate IPL device

Mdls:

#9110 - Mdl 1 or 2, 4962 attached
#9111 - Mdl 1F or 2F 4962 attached
#9112 - Mdl 3 or 4, 4962 attached

4964 Diskette Unit Attachment (#3581): Provides for the attachment to S/1 of 4964 Diskette Unit or a diskette within a 4962-2, 2F, or 4 Disk Storage Unit. Field Installation: Yes. Specify: #9136 for Primary IPL device, #9137 for Alternate IPL device. Note: When diskette function is included in a S/1 configuration, IPL from such a device is required for loading diagnostics.

4967 High Performance Disk Subsystem Attachment (#3596): Provides for the attachment of one primary 4967 Mdl 3CA disk drive and up to three 4967 Mdl 3CB expansion drives to Series/1. Multiple subsystems may be attached. Each subsystem requires one #3596. For complex subsystems or systems with more than eight 4967 disk units attached, contact the Series/1 Market Support Center.

Specify: Subsystem Number: One subsystem number, in sequence, for each #3596. See M4959 pages.

#923X - Where X is 1 through 8

Number of drives in this #923X Subsystem:

#9192 - One or Two drives attached
#9193 - Three or Four Drives Attached

Unit Sequence for Expansion Drives in this #923X Subsystem:

#9195 - First Expansion Drive
#9196 - Second Expansion Drive
#9197 - Third Expansion Drive

IPL:

#9164 - Primary IPL First Drive
#9165 - Alternate IPL First Drive
#9166 - Primary IPL Second Drive
#9167 - Alternate IPL Second Drive

4979 Display Station Attachment (#3585): Provides for attachment of the 4979 Display Station to S/1.

Specify: Keyboards:

#2956 Canada	#2955 Japanese
#2956 English US	English
#2964 French AZERTY	#2960 Spanish
#2970 French QWERTY	#2969 Spanish
#2957 German	Speaking
#2968 Italian	

4963 Disk Subsystem Attachment (#3590): Each #3590 provides for attachment of one 4963 mdl 23A, 29A, 58A, or 64A primary disk drive, and any mix of up to three 4963 mdl 23B, 29B, 58B, and 64B expansion drives, to S/1. Multiple subsystems may be attached. Each subsystem requires one #3590. For complex subsystems or systems with more than eight 4963 disk storage units contact the Series/1 Market Support Center. Field Installation: Yes.

Specify: Subsystem Number: One subsystem number, in sequence, for each #3590.

#925X - Where X is 1 through 8

IPL:

#9160 - Primary IPL first drive
#9161 - Alternate IPL first drive
#9162 - Primary IPL second drive
#9163 - Alternate IPL second drive

Number of Drives Attached:

#9180 - 1 or 2 drives attached
#9181 - 3 or 4 drives attached

4967 High Performance Disk Subsystem (#3595): Provides for the attachment of one primary 4967 mdl 2CA disk drive and up to three 4967 mdl 2CB expansion drives, to S/1. Multiple subsystems may be attached. Each subsystem requires one #3595. For complex subsystems or systems with more than eight 4967 disk units attached contact the Series/1 Market Support Center.

Specify: Subsystem Number: One subsystem number, in sequence, for each #3595.

#924X - Where X is 1 through 8

IPL:

- #9164 - Primary IPL 1st drive
- #9165 - Alternate IPL 1st drive
- #9166 - Primary IPL 2nd drive
- #9167 - Alternate IPL 2nd drive

Number of Drives Attached to this #924X Subsystem:

- #9182 - 1 or 2 drives attached
- #9183 - 3 or 4 drives attached

Series/1 to Personal Computer Channel Attachment Feature (#4000):

Provides a Series/1 high speed channel-to-channel gateway to an IBM Personal Computer in a network environment. The Series/1 to PC channel attachment is a microprocessor controlled Series/1 feature card and a PC channel extender card (feature #4000). Series/1 to PC channel attachment cable provides a 20 ft interconnect cable between the Series/1 and PC/PC-XT or PC-AT (feature #4001). Byte wide data transfer occurs at the maximum PC channel rate through the feature's shared data storage area. A communication test diskette supplements the standard Series/1 diagnostics provided with this feature. Service Information: Series/1 warranty and maintenance are applicable. Service for the Series/1 feature card (#4000) and PC cable interface #4001 is available from IBM Customer Engineering. Field Installation: Yes. Limitations: Available only on the 4959, 4965 I/O expansion units and 4954, 4955 and 4956 processors. Prerequisites: Series/1 to PC channel attachment cable, Series/1 (4954, 4955 and 4956 processors), an IBM Personal Computer System (PC/PC-XT/PC-AT) with a keyboard and monitor, and at least one diskette drive.

Specify: Series/1 IPL Options: The PC can be designated as the primary, secondary, or non-IPL device.

Function/Description	Code
Primary IPL	#9501
Secondary IPL	#9502
Non-IPL Device (Default)	#9503

Publications:

- "IBM Series/1 to Personal Computer Channel Attachment Description Manual", GA34-0287
- "IBM Personal Computer - Series/1 to Personal Computer Channel Attachment Guide to Operations Kit", SX34-0170
- "IBM Personal Computer - Series/1 to Personal Computer Channel Attachment Hardware Maintenance and Service Kit", SX34-0171

Series/1 to Personal Computer Channel Attachment Cable (#4001):

Provides interconnecting cable between the Series/1 feature card and the IBM Personal Computer channel extender card. The Series/1 to PC channel attachment cable is a 20 ft interconnect cable to connect the Series/1 feature card and the PC channel extender card (the Series/1 feature card and the PC channel extender card are both provided by feature code #4000). Series/1 to PC channel attachment cable is a shielded multi-twisted-pair cable and can be ordered in a 20 ft length only (feature #4001). Field Installation: Yes. Limitations: Available only on the 4959, 4965 I/O Expansion units and 4954, 4955 and 4956 processors. Prerequisites: Series/1 to PC channel attachment feature, Series/1 (4954, 4955 and 4956 processors), an IBM Personal Computer System (PC/PC-XT/PC-AT) with a keyboard and monitor, and at least one diskette drive. Publications: "IBM Series/1 to Personal Computer Channel Attachment Description Manual," GA34-0287

4974 Printer Attachment (#5620): Provides for S/1 attachment to the 4974 Printer. Supports program selection of six or eight lines per inch. Field Installation: Yes.

4973 Line Printer Attachment (#5630): Provides for attachment of the 4973 Printer to S/1. Field Installation: Yes.

Printer Attachment - 5200 Series (#5640): Provides two ports for the attachment of the following printer configurations to the S/1:

- Any mix of 5219s mdl D01/D02 and 5224s mdl 1/2 up to eight printers, or

- One 5225 mdl 1/2/3/4 and a mix, up to seven printers, of 5219s mdl D01/D02 and 5224s mdl 1/2, or
- Two 5225s and a mix, up to five printers, of 5219s mdl D01/D02 and 5224s mdl 1/2, or
- Three 5225s mdl 1/2/3/4 and a mix, up to three printers, of 5219s mdl D01/D02 and 5224s mdl 1/2, or
- Four 5225s mdl 1/2/3/4 and one 5219 mdl D01/D02 or 5224 mdl 1/2 printer, or
- One 5262 and up to five 5219s mdl D01/D02, or
- Two 5262s and up to three 5219s mdl D01/D02, or
- One 4234 mdl 2 printer.

Feature #5640 is capable of driving three printer mixes at their rated speed. Actual printer performance, however, will be a function of the operating system. The 4234 Printer is supported by Event Driven Executive (EDX) Version 5.2, defined as a 5225. The 4234 Printer is not supported by Realtime Programming System (RPS) operating system. Up to seven printers may be attached to a single port on #5640. Printers located within 30.5m (100 ft) (actual distance -- not cable length) of #5640 must be of the same machine type. Maximum cable length is 1,524m (5,000 ft) using twinaxial cable. See "Accessories" for Attachment Cable (#5780).

4982 Sensor Input/Output Unit Attachment (#6305): Provides for attachment of the 4982 Sensor Input/Output Unit to S/1. Field Installation: Yes.

Specify: Functions included in the attached 4982.

- #9100 - Analog Input
- #9101 - Digital Output
- #9102 - Digital Input Isolated
- #9103 - Digital Input Non-Isolated
- #9104 - Analog Output

Programmable Two-Channel Switch (#7777): Provides the capability to switch I/O Expansion Units and their attached devices (common I/O) between two different processors. This allows processor backup for all the common devices on the channel beyond the #7777 in the event of a primary processor failure. The #7777 has two modes of operation, manual and programmable.

In manual mode the #7777 is controlled by an operator from the Console Control Panel located adjacent to the power switch on the 4959 or 4965. To operate the switch in manual mode the rotary Mode Select Switch on the console is placed in the manual position and the Reverse push button is depressed. Each depression of the Reverse push button causes #7777 to switch or reverse processors.

In programmable mode the Mode Select Switch is placed in the program position and the #7777 is under program control. Switching in programmable mode can occur in one of three different ways:

1. The nonconnected processor can request the connected processor to release the #7777. The connected processor releases the #7777 and switchover occurs.
2. The connected processor senses a failure condition and directs the #7777 to switch the common I/O to the nonconnected processor.
3. The connected processor senses a failure condition and causes the #7777 to switch the common I/O to itself. The processors communicate with each other via four one-word-wide registers on the #7777 attachment card. One read and one write register is assigned to each processor.

The Console Control Panel is added to the expansion unit adjacent to the power switch when the #7777 is installed. The console contains several switches and indicator lights:

- The Initial Select Switch is placed in the A or B position to set the initial connection of the common I/O at power-on.
- The rotary Mode Select Switch is used to put the #7777 in program, manual or service mode.
- The Reverse push button when depressed causes the #7777 to reverse processors if the rotary Mode Select Switch is in the manual position. The #7777 reverses processor connection for each depression of the Reverse push button.

- The Power-On indicator is lit when the expansion unit power is on.
- The Connect A or B indicator shows the present switch connection.
- The Manual indicator is lit when the #7777 is in manual mode.
- The Acknowledge A or B indicators are used in manual mode to inform the operator when the common I/O channel is ready to be switched.

Two external signals are available for user connection of external alarms or devices. One tracks the #7777 connect position, the other is actuated during an emergency connect command sequence.

Note: The #7777 attachment card mounts in either the 4959 or 4965 I/O Expansion Unit. It occupies the Channel Cable position NOT an I/O feature position.

Primary or Alternate IPL devices for either processor may be attached to the common I/O channel.

Specify: (if required):

#9170 - Primary IPL A Side Processor
#9171 - Alternate IPL A Side Processor
#9172 - Primary IPL B Side Processor
#9173 - Alternate IPL B Side Processor

The physical relationship of the processors and expansion units is critical due to the length of the #7777 cables. Designate the configuration desired by ordering one of the following specify codes:

Specify #9220 for Single-Rack 'Y' connection. In this configuration the #9301 processor is attached to the A side of the #7777 and the #9302 processor is attached to the B side of the #7777.

Processor Mdl 000 #9301
Expansion Unit
Processor Mdl 00X #9302

Specify #9221 for Two-Rack 'Y' connection. In this configuration the #9301 processor is attached to the A side of the #7777 and the #9302 processor is attached to the B side of the #7777.

	Expansion Unit
Processor Mdl 00X #9302	Processor Mdl 000 #9301

Specify #9222 for Two-Rack Quad connection. In this configuration there are two processors, two expansion units and two #7777s.

Expansion Unit	Expansion Unit
Processor Mdl 00X #9302	Processor Mdl 000 #9301

Specify #9223 for Three-Rack Quad connection. The connection of the #7777 will be the same as the connection of #9222.

Expansion Unit #9302	Expansion Unit #9301	
Processor Mdl 00X #9302		Processor Mdl 000 #9301

Specify #9224 for Three-Rack Quad connection with a private I/O expansion unit. In this configuration there are two processors, two common I/O expansion units, two #7777s, and one private I/O expansion unit. The #7777 connection will be basically the same as #9222. The exception being the #9302 expansion unit above the #9302 processor which is a private expansion unit. Therefore the #7777 in the common expansion unit #9302 to the I/O channel in the private #9302 expansion unit.

Private Expansion Unit #9302	Common Expansion Unit #9301	Common Expansion Unit #9301
Processor Mdl 00X #9302		Processor Mdl 000 #9301

Specify #9225 when a configuration other than those described above is desired and submit a configuration RPQ to Special Product Marketing in Boca Raton.

Note: Channel Repower #1565 is required to attach I/O expansion units to processors or other expansion units.

System orders containing a 4959 or 4965 with a Programmable Two-Channel Switch (#7777) must include at least two processors in any combination. Independent orders for 4959 or 4965 with #7777, or MES orders for #7777, must be placed against a system including at least two processors. Field Installation: Yes.

Timers (#7840): Two timers per feature. Provides five time-interval options per timer (1, 5, 25, and 50 microseconds internal and one external). May be externally clocked and used as a pulse width or pulse frequency counter. See "Accessories" for optional "Customer Access Panel #1590". Field Installation: Yes.

Teletypewriter Adapter (#7850): Provides for S/1 attachment to a standard Teletype ASR33, 35, or equivalent device operating full-duplex 20/60 mA current loop. Twelve bit rates (50, 75, 100, 110, 150, 200, 300, 600, 1200, 2400, 4800, 9600 bps). Supports IPL. Provides TTL level compatible capability. An external power supply may be used to provide power to the current loop. Has EIA voltage level capability. Cables #2064 and #2065 are available for EIA full-duplex operation. Cable #2066 is available for current loop connection to the 3101 Display Terminal. For other associated cables --- see "Cables" under "Accessories" below --- also for optional Customer Access Panel #1590. Limitations: The EIA voltage level capability is intended for direct connect only. The interface, an EIA RS-232-C subset, is not intended for use with a modem. Field Installation: Yes. Prerequisites: May require Communications Power #2010. (See #2010 feature description.) Specify: #9146 for Primary IPL device, #9147 for Alternate IPL device.

Two-Channel Switch (#7900): Provides ability to switch the S/1 I/O channel between two processors. Allows a secondary or alternate processor to take control of all I/O devices on the channel beyond the #7900 in the event of failure of the primary or normal processor to which the devices are attached. #7900 can be operated in two modes, manual or backup. In backup mode, the Initial Period Timer is set to a time period selected by the user. If the primary processor fails to reset this timer within the selected time period, #7900 attempts to interrupt the primary processor. The primary processor then has an additional specified warning period in which to issue the Reset Timer command. If at the end of this interval #7900 has not received the Reset Timer command, an interrupt will be issued

to both processors. The secondary processor can then issue a Re-set and Connect command, which will attach all common I/O to that secondary processor. If #7900 is in manual mode, the common I/O is connected to the processor selected by the position of the manual select switch.

A special console is added to a 4959 or 4965 when #7900 is installed. This includes a mode switch (manual or backup), manual select switch, indicator lights, and isolated alarm contacts to allow external attachment of some alarm device if desired. This console is located adjacent to the 4959 or 4965 power switch and indicator.

Note: #7900 mounts in either 4959 or 4965 unit. It occupies the I/O channel cable position, not an available I/O feature position.

When the configuration is a simple "Y", one 4959 or 4965 with #7900 and two processors, or a simple "quad", two 4959s or 4965s, each with a #7900 and two processors, no special considerations are required. For more complex configurations contact the International Support Center in Boca Raton. System orders which contain a 4959 or 4965 with a Two-Channel Switch (#7900) must include at least two processors in any combination. Independent orders for 4959 or 4965 with #7900, or MES orders for #7900, must be placed against a system including at least two processors. Field Installation: Yes.

Specify:

TCS Timer Period - Initial Period:

#9701 - 0.125 seconds
#9702 - 1.0 seconds
#9703 - 8.0 seconds
#9704 - 16.0 seconds

TCS Timer Period - Warning Period:

#9710 - 0.0 seconds
#9711 - 0.125 seconds
#9712 - 1.0 seconds

IPL Block:

#9120 - First processor blocked from IPL by any common I/O device.
#9121 - Second processor blocked from IPL by any common I/O device.

Console Language:

English US #0150 Italian #0132
French #0128 Spanish #0131
German #0129

COMMUNICATIONS FEATURES

4987 Programmable Communications Subsystem Controller (#1300): Provides for the attachment of one 4987 Programmable Communications Subsystem. A 2-card feature requiring contiguous I/O feature positions. This feature controls one scanner (included with the 4987) and a maximum of 16 features (up to 32 lines) in the attached 4987. A second #1300 controller may be used with the 4987 Expansion Scanner (#3600 located in 4987) to increase 4987 throughput. In this case, each #1300 serves one scanner and up to eight features (up to 16 lines) in the 4987. Field Installation: Yes. Specify: #89XY. For each controller, a function code must be provided of the form #89XY, where X, the tens digit, is a sequence number; 1, 2, 3, --- etc., as defined for each 4987 in the configuration, and Y, the units digit, is selected as follows:

Y	Associated Scanner	No. of 47XX Features Served by Controller
1	Basic	1-2
2	Basic	3-4
3	Basic	5-8
4	Basic	9-16
6	Expansion	1-2

7	Expansion	3-4
8	Expansion	5-8

S/I Local Communications Controller (#1400): This feature provides for the interconnection of up to 16 S/I processors. The ring is clocked at 2,000,000 bps. A micro-controller and associated circuitry provide for cycle-stealing, control buffers and error handling. A peer-to-peer ring topology is provided through cable termination and connection. Maximum cable length between active processors is 1,524m (5,000 ft). Refer to "Cables" and connectors under "Accessories" for customer options. The feature includes a bypass relay and 2.44 meter (8 foot) connecting cables. It allows data to flow through a powered-down unit when total cable length between active units is less than 1,524m (5,000 ft). Two cards are provided, provided, one for the local communications controller and one for the controller cable attachment that plugs into the controller card. Therefore only one feature slot is required. Field Installation: Yes.

Asynchronous Communications Single Line Control (#1610): Provides a cycle-steal attachment and control for a single communications line via an EIA RS-232-C/CCITT V.24 interface. Supports half-duplex start/stop operation only. Data rates are program-selectable within two jumperable ranges (37.5 to 1200 and 300 to 9600 bps). Local attachment via the Asynchronous Local Attachment Cable (#2056) or connection to a modem via EIA Data Set Cable (#2057). #1610 provides two modes of operation: PTT mode for use with the 2740/2741, and 8-bit Data Interchange mode (8 data-bits, 2 stop-bits) for use with the Teletype ASR 33/35. #1610 provides support for point-to-point (switched and nonswitched) and multipoint control operations. Auto-answer facility is provided. See "Integrated Communications Feature Function Specify Codes" below. For associated cables, see "Accessories" below. Field Installation: Yes.

Specify: A function specify code is required for each #1610 ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Funcnt Specify Code	Compatible IBM Cable(s)	Description
#8100	#2056	Low-speed, direct connect, HD
#8101	#2056	Low-speed, direct connect, FD
#8102	#2057	Low-speed, sw network, HD
#8103	#2057	Low-speed, sw network, FD
#8104	#2057	Low-speed, sw network, HD, carrier-detect provided
#8105	#2057	Low-speed, sw network, FD, carrier-detect provided
#8106	#2057	Low-speed, nonsw line, HD
#8107	#2057	Low-speed, nonsw line, FD
#8108	#2057	Low-speed, nonsw line, HD, carrier-detect provided
#8109	#2057	Low-speed, nonsw line, FD, carrier-detect provided
#8110	#2056	Medium-speed, direct connect, HD
#8111	#2056	Medium-speed, direct connect, FD
#8112	#2057	Medium-speed, sw network, HD
#8113	#2057	Medium-speed, sw network, FD
#8114	#2057	Medium-speed, sw network, HD, carrier-detect provided
#8115	#2057	Medium-speed, sw network, FD, FD carrier-detect provided
#8116	#2057	Medium-speed, nonsw line, HD
#8117	#2057	Medium-speed, nonsw line,

- #8118 #2057 Medium-speed, nonsw line, HD, carrier-detect provided
- #8119 #2057 Medium-speed, nonsw line, HD, carrier-detect provided

Communications Indicator Panel (#2000): Provides visual display of various states and conditions of a single selectable communication line as well as providing a means of manually controlling certain modem functions. The panel attaches to any single or multiline control by a connector on the feature. Line selection and information to be displayed is selected by eight switches on the panel. Eight lights are used for the display. Coded information is displayed showing status information and modem control line settings such as Data Set Ready, Clear-to-Send, Transmit and Receive Data Lines. Mounts under front cover of machine. Does not require a feature position. Limitations: Cannot be mounted in half-width units 4952A, 4953A, 4953C, 4954A or full-width units 4952C, 4954C, 4965C, 4965 mdl 001. Field Installation: Yes.

Communications Power (#2010): Provides + and - 12 volts DC regulated power. Required in 4953B or D, 4955A, B, C, D or 4959 containing one or more integrated communications features #1250, #1310, #1610, #2074, #2075, #2080, #2090, #2091, #2092, #2093, #2094, #2095, #2096, and #5640. Required in above machines containing Teletypewriter Adapters (#7850) configured for EIA voltage interface or for current loop where S/1 supplies the power. This feature is installed in the power supply section, and does not occupy a feature position. Field Installation: Yes.

Binary Synchronous Communication Single Line Control (#2074): Provides a half-duplex single BSC Communications line capability, with an EIA RS-232-C/CCITT V.24 compatible line interface via a cycle-steal channel attachment. Data rates up to 9600 bps are supported. Internal clocking of 1200 bps or 600 bps is provided for those modems which do not provide clocking. Provides support for EBCDIC and ASCII codes, and supports transparency (unrestricted binary data) when using EBCDIC code. #2074 provides support for point-to-point (switched and nonswitched) and multipoint (control and tributary station) operation. Auto-answer facility is provided. IPL from another system is supported by this feature when remote IPL is specified. See "Integrated Communications Feature Function Specify Codes" below. For associated cables, see "Cables" under "Accessories" below. Field Installation: Yes.

Specify: #9154 for Remote IPL. A function specify code is required for each #2074 ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Funct Compatible
Specify IBM
Code Cable(s) Description

- #8120 #2057 Multipt tribty, HD
- #8121 #2057 Multipt tribty, intrnl clocking, HD
- #8122 #2057 Sw network, HD
- #8123 #2057 Sw network, ring indicator provided, HD
- #8124 #2057 Sw network, intrnl clocking, HD
- #8125 #2057 Sw network, intrnl clocking, ring indicate provided, HD
- #8126 #2057 Nonsw line, HD
- #8127 #2057 Nonsw line, FD
- #8128 #2057 Nonsw line, internalclocking, HD
- #8129 #2057 Nonsw line, internalclocking FD

Binary Synchronous Communications Single Line Control/High-Speed (#2075): Provides a half-duplex single BSC communications line capability, with interfaces for a Western Electric 303 Data Set or equivalent (via cable #2058) and for CCITT V.35 compatible Data Sets (via cable #2060), and a cycle-steal channel attachment. Data rates up to 56K bps are supported. Provides support for EBCDIC and ASCII codes and supports transparency (unrestricted binary data) when using EBCDIC code, all under program control. IPL from another system is supported by this adapter when remote IPL is specified. Limitations: Maximum of eight in any single machine. See "Integrated Communications Feature Function Specify Codes" below. For associated cables, see "Cables" under "Accessories" below. Field Installation: Yes.

Specify: #9155 for Remote IPL. A function specify code is required for each #2075 ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Funct Compatible
Specify IBM
Code Cable(s) Description

- #8161 #2060 CCITT V.35, nonsw line, HD
- #8162 #2060 CCITT V.35, nonsw line, FD
- #8163 #2060 CCITT V.35, multipt tribty
- #8164 #2058 WE303, nonsw line, HD
- #8165 #2058 WE303, nonsw line, FD
- #8166 #2058 WE303, multipt tributary

Synchronous Communications Single Line Control/High-Speed (#2080): Provides a cycle-stealing attachment and control for a single communications line operating under either a Binary Synchronous Communication (BSC), Synchronous Data Link Control (SDLC), or High Level Data Link Control (HDLC) protocol via a leased CCITT V.35 interface or a local connect interface RS-422-A, or with leased/switched circuit operation of CCITT Recommendation X.21. Can communicate using any 8-bit data code including EBCDIC and ASCII. Zero bit insertion/deletion and block check character generation/checking is automatically performed. NRZ or NRZI coding is available. The attachment provides remote IPL capability using both the BSC and SDLC/HDLC protocols.

Local 1 operation allows for connection using RS-422-A interface without clocking supplied through the cable (1,219m (4,000 ft) maximum) at 9600 bps (10 multipoint stations allowed). Each station must derive clocking from the data stream. SDLC/HDLC half-duplex (HDX) operation is provided by a local 1 connection.

Local 2 operation allows for connection using RS-422-A interface with clocking supplied through the cable (300m (1,000 ft) maximum) at 48K bps (10 multipoint stations allowed). Both BSC HDX and SDLC/HDLC half or full-duplex (FDX) operation is provided by a local 2 operation.

High-Level Data Link Control (HDLC) is supported for half and full-duplex operation (ABM and NRM mode as described by CCITT Recommendation X.25) at speeds up to 56K bps via a DCE conforming to CCITT V.35 or at speeds up to 48K bps via a CCITT X.21 leased circuit interface. Programming support is provided by X.25/HDLC Communications Support which consists of two programmable interfaces: Frame level interface and packet level interface. These interfaces correspond, respectively, to level 2 and level 3 of CCITT X.25. Remote IPL capability is supported.

Using SNA, HDX operation is supported up to 9600 bps via a CCITT Recommendation X.21 leased/switched circuit interface.

To assist in future migration to SDLC/HDLC protocols, BSC capabilities are provided for HDX up to 56K bps with the V.35 interface and up to 48K bps with the X.21 interface. Provides support for EBCDIC and ASCII codes and supports transparency (unrestricted binary data) when using EBCDIC code. The sustained throughput when using Binary Synchronous Communications at speeds of 48K and 56K bps will be considerably less than clocking rate dependent upon message size to a maximum throughput of 15K bps.

See "Integrated Communications Feature Function Specify Codes" below. Cable #2060 provides connection to a CCITT V.35 compatible modem. Cable #2067 provides connection to a CCITT X.21 interface. The customer is responsible for providing a cable for local connection. For associated cables, see "Cables" under "Accessories" below. Field Installation: Yes.

Specify: A function specify code is required for each #2080 ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Funct Specify Code	Compatible IBM Cable(s)	Description
#8170	#2060	BSC, V.35
#8171	#2060	SDLC/HDLC, V.35
#8172	#2060	BSC, IPL, V.35
#8173	#2060	SDLC/HDLC, IPL, V.35
#8175	#2067	BSC, X.21
#8176	#2067	SDLC/HDLC, X.21
#8177	#2067	BSC, IPL, X.21
#8178	#2067	SDLC/HDLC, IPL, X.21
#8180	#2067	BSC sw X.21
#8181	#2067	SDLC/HDLC, sw X.21
#8182	#2067	BSC, IPL, sw X.21
#8183	#2067	SDLC/HDLC, IPL, sw X.21

SDLC Single Line Control (#2090): Provides a cycle-stealing attachment and control for a single communications line operating under Synchronous Data Link Control (SDLC) or High Level Data Link Control (HLDC) protocol via an EIA RS-232-C/CCITT V.24 interface. The feature card may be connected to switched or non-switched communication lines. One feature card may be used as a half-duplex communications port or two feature cards may be used as a pair to handle a full-duplex operation at EC level 467013 and above. Data rates up to 19.2K bps using external clocking are supported. Internal (business machine) clocking at 600 or 1200 bps provides for use when the modem does not provide clocking. NRZI coding is used with internal clocking. With external clocking, either NRZ or NRZI coding may be used. Can communicate using any 8-bit data code including EBCDIC and ASCII. Zero-bit insertion/deletion and block check character generation/checking automatically performed.

High Level Data Link Control (HDLC) is supported for half and full-duplex operation (ABM and NRM mode as described by CCITT Recommendation X.25) at speeds up to 19.2K bps via a RS-232-C interface on leased or switched lines. Programming support is provided by X.25/HDLC Communications Support which consists of two programmable interfaces, frame level and packet level. These interfaces correspond respectively, to level 2 and level 3 of CCITT Recommendation X.25.

Using SNA, HDX operation is supported up to 19.2K bps with RS-232-C on leased or switched lines. See "Integrated Communications Feature Function Specify Codes" below. For associated cables, see "Cables" under "Accessories" below. Field Installation: Yes.

Specify: A function specify code is required for each #2090 ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Funct Specify Code	Compatible IBM Cable(s)	Description
#8130	#2057	Sw network, HD
#8131	#2057	Sw network, ring indicator provided, HD
#8132	#2057	Sw network, intrnl clocking, ring indicator

#8134	#2057	Nonsw line, HD
#8135	#2057	Nonsw line, FD
#8136	#2057	Nonsw line, intrnl clocking, HD
#8137	#2057	Nonsw line, intrnl clocking, FD
#8138	#2062	Sw network, FD
#8139	#2062	Sw network, FD Ring Indicate provided
#8140	#2062	Non-sw line, FD
#8200	#2062	FDX-DLC 8T1067 mode

Asynchronous Communications 8-Line Control (#2091): Provides cycle-stealing control function for one or two Asynchronous Communications 4-Line Adapters #2092. Provides support for a maximum of eight lines, each operating at a maximum of 2400 bps. See "Integrated Communications Feature Function Specify Codes" below. Field Installation: Yes.

Specify: Sequence of controller within processor 4959 or 4965.

#8141	First Controller
#8142	Second Controller
#8143	Third Controller
#8144	Fourth Controller
#8155	Fifth Controller
#8146	Sixth Controller

Asynchronous Communications 4-Line Adapter (#2092): Provides for attachment of up to four half-duplex communications lines. Attachment to the communications lines is via EIA RS-232-C/CCITT V.24 interface. Data rates are program-selectable within two jumper-selectable ranges (37.5 to 1200 and 300 to 2400 bps). The jumper sets the rate range for all four lines. Local attachment of a terminal is via the Asynchronous Local Attachment Cable #2056 or connection to a modem via EIA Data Set Cable #2057. This feature in conjunction with the Asynchronous 8-Line Communications Control #2091 provides functional capability similar to the Asynchronous Communications Single Line Control #1610 with the exception that no IPL facility is provided and the data rate per line is limited to a maximum of 2400 bps. Limitations: No more than two Asynchronous Communications 4-Line Adapters may be controlled by a single Asynchronous Communications 8-Line Control (#2091). #2092 must be located in same machine as its associated controller, and installed in a feature position immediately adjacent to the controller. See "Integrated Communications Feature Function Specify Codes" below. For associated cables, see "Cables" under "Accessories" below. Field Installation: Yes. Prerequisites: #2091.

Specify: A function specify code is required for each of #2092, ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Funct Specify Code	Compatible IBM Cable(s)	Description
--------------------------	-------------------------------	-------------

X = Controller Number (x = 1 to 6)

#820X	#2056	Low-speed, direct connect, HD
#821X	#2056	Low-speed, direct connect, FD
#822X	#2057	Low-speed, sw network, HD
#823X	#2057	Low-speed, sw network, FD
#824X	#2057	Low-speed, sw network, HD, carrier-detect provided
#825X	#2057	Low-speed, sw network, FD, carrier-detect provided
#826X	#2057	Low-speed, nonsw line, HD
#827X	#2057	Low-speed, nonsw line, FD
#828X	#2057	Low-speed, nonsw line, HD, carrier-detect provided
#829X	#2057	Low-speed, nonsw line, FD,

carrier-detect provided

#830X	#2056	Medium-speed, direct connect, HD
#831X	#2056	Medium-speed, direct connect, FD
#832X	#2057	Medium-speed, sw network, HD
#833X	#2057	Medium-speed, sw network, FD
#834X	#2057	Medium-speed, sw network, HD, carrier-detect provided
#835X	#2057	Medium-speed, sw network, FD, carrier-detect provided
#836X	#2057	Medium-speed, nonsw line, HD
#837X	#2057	Medium-speed, nonsw line, FD
#838X	#2057	Medium-speed, nonsw line, FD, carrier-detect provided
#839X	#2057	Medium-speed, nonsw line, FD

Binary Synchronous Communications 8-Line Control (#2093): Provides cycle-stealing control function for one or two Binary Synchronous Communications 4-Line Adapters (#2094). Data rates up to 9600 bps per line are supported with the following limitations:

- Only lines 0 and 1 can operate at 9600 bps.
- With lines 0 and 1 operating at 9600 bps, up to six additional lines at rates up to 2400 bps may be attached.
- When only four lines are attached, each can operate at rates up to 4800 bps.

Internal clocking of 600 to 1200 bps is provided for those modems which do not provide clocking. Features #2093 and #2094 provide functional capability similar to the Binary Synchronous Communications Single Line Control #2074 with the exception that IPL capability is not provided. See "Integrated Communications Feature Function Specify Codes, Limitations and Prerequisite" below. Field Installation: Yes.

Specify: Controller Sequence within a processor, 4959 or 4965.

#8151 First Controller
#8152 Second Controller
#8153 Third Controller

Binary Synchronous Communication 4-Line Adapter (#2094): Provides for attachment of up to four half-duplex BSC communications lines via EIS RS-232-C/CCITT V.24 compatible line interfaces. Limitations: No more than two Binary Synchronous Communications 4-Line Adapters may be controlled by one Binary Synchronous Communications 8-Line Controller #2093. Must be located in the same machine as its associated controller, and must be installed in a feature position immediately adjacent to the controller. See "Integrated Communications Feature Function Specify Codes, Limitations and Prerequisites" below. For associated cables, see "Cables" under "Accessories" below. Field Installation: Yes. Prerequisites: #2093.

Specify: A function specify code is required for each #2094 ordered. This code is used to set jumper-selectable options of line speed, network attachment and common carrier facility at time of manufacture. They may be reset as required in the field.

Func Compatible
Specify IBM
Code Cable(s) Description

X = Controller Number

#840X	#2057	Multipt tribty, HD
#841X	#2057	Multipt tribty, intrnl

#842X	#2057	Sw network, HD
#843X	#2057	Sw network, ring indicator provided, HD
#844X	#2057	Sw network, intrnl clocking, HD
#845X	#2057	Sw network, intrnl clocking, ring indicator provided, HD
#846X	#2057	Nonsw line, HD
#847X	#2057	Nonsw line, FD
#848X	#2057	Nonsw line, intrnl clocking, HD
#849X	#2057	Nonsw line, intrnl clocking, FD

Feature-Programmable 8-Line Communications Control (#2095): Provides cycle-stealing control function for one or two Feature-Programmable 4-Line Communications Adapters #2096. Supports the command set (8-bit Data Interchange mode only) provided by the Asynchronous 8-line Communications Control #2091. Also provides flexibility in the attachment of asynchronous and synchronous protocol devices. Provides support for operator-driven full-duplex terminals as well as support for right-shifted character codes (e.g., ASCII). The aggregate controller throughput is 64,000 bps (when using 12-bit characters). Note: The feature-programmable controlling provides character-synchronous operation and accommodates Airline Control protocol but does not support IBM binary synchronous protocol. For Airline Control protocol, two ports of the adapter and EIA Full-Duplex Cable (RPQ D02063) are required. Field Installation: Yes.

A description of the specify codes follows:

Specify
Code Description

X = #2095 Controller number 1 - 6

80X0	HS, LS line, 4-wire
80X1	HS, LS line, 2-wire, DC
80X2	LS, LS line, 4-wire
80X3	LS, LS line, 2-wire, DC
80X4	HS, SW line
80X5	LS, SW line
80X6	HS, current loop
80X7	LS, current loop

Feature-Programmable 4-Line Communication Adapter (#2096): Provides for attachment of up to four half-duplex communications lines. Attachment to the communications line is via EIA RS-232-C/CCITT V.24 interface. In addition, each line has the jumper-selectable option to provide local attachment using a 20 mA current loop connection. Data rates for asynchronous operation are program selectable within two jumper selectable ranges (37.5 to 1200 and 300 to 19,200 bps). For synchronous operations, external clocking is required. Modem connection for a line is EIA Data Set Cable #2057. For current loop operation, connection is provided by the Current Loop Cable #2061, and by the 3101 Display Terminal Current Loop Cable #2066 for use with the 3101. Local attachment of an asynchronous terminal to a line is provided, via the Asynchronous Local Attachment Cable #2056. Limitations: No more than two Feature-Programmable 4-Line Communications Adapters may be controlled by a single Feature-Programmable 8-Line Communications Control #2095. The adapter must be located in the same machine as its associated controller and installed in a feature position immediately adjacent to the controller. A maximum of 20 current loop lines per processor or I/O expansion unit may be configured. Field Installation: Yes. Prerequisites: #2095.

Telephone Communications Controller (#7880): Provides the control and data transfer function for one to four Telephone Communications Adapters #7881. Field Installation: Yes.

Telephone Communications Adapter (#7881): Provides for attachment to one line of a public or private switched telephone exchange. The adapter will answer and originate calls, generate and detect

standard push-button phone signals and digitally encode and decode voice signals. (Canada only) Attachment to the telephone system requires a customer installed and maintained approved service connecting arrangement. Cable #2070 is available for connection to a Data Access Arrangement (DAA). Cable #2071 is available for connection to a Voice Connecting Arrangement (VCA). Limitations: Adapters must be assigned feature positions immediately adjacent to the attached controller. Maximum: Four adapters per controller. Note: When used in conjunction with the IBM Audio Distribution System (5719-U20) licensed program, the

maximum is three adapters per controller. Field Installation: Yes. Prerequisites: #7880.

Integrated Communication Feature Function Specify Codes: The units digit of the specify code for each line of a multiline adapter (X in the table) must be the same as the units digit of its associated controller sequence code (1, 2, or 3). Table A shows optional cables and a default function specify code if selection criteria are unavailable. See also special feature sections for valid specify codes.

S/1 INTEGRATED COMMUNICATION FEATURES - Table A

Description	Feature	Cable	Default Function Specify Code	Valid Function Specify Codes
Asynchronous:	#1610			
Single-Line with Direct cable		#2056	#8111	#8100, #8101 #8110, #8111
with EIA Cable		#2057	#8114	#8102-#8109, #8112-#8119
Binary Synchronous:	#2074			
Single-line with EIA Cable		#2057	#8123	#8120-#8129
EIA Data Set Cable Full-Duplex		#2062		
Binary Synchronous:	#2075			
Single-line HS-WE303 CCITT/V.35		#2058 #2060	#8165 #8162	#8164-#8166 #8161-#8163
SDLC:	#2090			
Single-line with EIA		#2057	#8134	#8130-#8137
EIA Data Set Cable Full-Duplex		#2062		#8200
Asynchronous:	#2092			
Multi-line with Direct Cable		#2056	#831X	#820X-#821X, #830X-#831X
with EIA Cable		#2057	#834X	#822X-#829X, #832X-#839X
BSC:	#2094			
Multi-line with EIA Cable		#2057	#842X	#840X-#849X
EIA Data Set Cable Full-Duplex		#2062		

Feature Programmable
4-Line Communication
Adapter: #2096

EIA Data
Set Cable #2057

Current Loop
Cable #2061

EIA Data Set
Cable Full-Duplex #2062

Asynchronous Local
Attach Cable #2065

Compatible IBM Modems:

Feature	3872	Modem 3863	3864	3865
#1310	(2)	(2)	(2)	(2)
#1610				
#2074	X	X	X	X
#2075				
#2090	X	X	X	X
#2092				
#2094	X	X	X	X
#2096	(1)	(1)	(1)	(1)

- (1) Synchronous mode only.
(2) Binary synchronous mode.

SPECIFICATION TABLE

This table is provided to determine how many 4959 Input/Output Expansion Units are required to contain the desired features. Lo-

cations are expressed as a negative number for availability. A positive number is used for feature requirement. The sum of the availability and requirements number cannot exceed zero.

Machine/ Feature Number	Feature Positions	Notes
4959 Input/Output Expansion Unit	-14	
#1200 4933 Series/1 - S/370		
Channel Attachment Feature	+1	
#1205 4966 Diskette Magazine Unit		
Attachment	+1	
#1210 5250 Information Display		
System Attachment	+2	(2)
(No Longer Available)		
#1215 4969 Magnetic Tape		
Subsystem Attachment	+1	
#1220 4968 Autoload Streaming Magnetic		
Tape Unit Attachment	+1	
#1250 Multidrop Workstation Attachment	+1	
#1300 Programmable Communications		
Subsystem Controller	+2	(2)
#1310 Multifunction Attachment	+1	(1)
#1400 S/1 Local Communications		
Controller	+1	(4)
#1560 Integrated Digital Input/Output		
Non-Isolated	+1	
#1565 Channel Repower	+1	
#1610 Asynchronous Comm Single		
Line Control	+1	(1)
#2074 Binary Synchronous Comm Single		
Line Control	+1	(1)
#2075 Binary Sync Comm Single Line		
Control/HS	+1	(1)
#2080 Sync Comm Single Line		

MACHINES

	Control/HS	+1	(1)
#2090	Sync Data Link Control	+1	(1)
#2091	Asynchronous Comm 8-Line Control	+1	
#2092	Asynchronous Comm 4-Line Adapter	+1	(1, 3)
#2093	Binary Synchronous Comm 8-Line Control	+1	
#2094	Binary Synchronous Comm 4-Line Adapter	+1	(1, 3)
#2095	Feature-Programmable 8-Line Comm Control	+1	
#2096	Feature-Programmable 4-Line Comm Adapter	+1	(1, 3)
#3580	4962 Disk Storage Unit Attachment	+1	
#3581	4964 Diskette Unit Attachment	+1	
#3585	4979 Display Station Attachment (No Longer Available)	+1	
#3590	4963 Disk Subsystem Attachment	+1	
#3595	4967 High Performance Disk Subsystem Attachment Mdl 2CA	+1	
#3596	4967 High Performance Disk Subsystem Attachment Mdl 3CA	+1	
#5620	4974 Printer Attachment	+1	
#5630	4973 Line Printer Attachment	+1	
#5640	Printer Attachment 5200 Series	+1	
#6305	4982 Sensor Input/Output Unit Attachment	+1	
#7840	Timers	+1	
#7850	Teletypewriter Adapter	+1	(1)
#7880	Telephone Communications Controller	+1	
#7881	Telephone Communications Adapter	+1	(1, 3)
RPQ	D02038 4978 Display Station Attachment	+1	
RPQ	D02118 GPIB Adapter	+1	
RPQ	D02350 8-Line RS-422 Adapter	+1	(1, 3)

Notes:

1. Requires #2010 to provide + and - 12 volts.
2. Must be contiguous I/O feature positions.
3. Must be in contiguous I/O feature position with its associated controller.
4. Branch level system assurance is required before ordering this feature.

MODEL CONVERSIONS (NONE)

ACCESSORIES

Customer Access Panel (#1590): Assembly to provide an interface to the surface of rack with quick disconnect type connection for Integrated Digital Input/Output (#1560) or Customer Direct Program Control Adapter #5430 (NO LONGER AVAILABLE) features (up to four in any mix), plus one Timer (#7840) with external sources and one Teletypewriter Adapter (#7850) can be accommodated by the panel. Connecting cables from panel for Timer and Teletypewriter Adapter are included. Cables for connected Integrated Digital Input/Output and Customer Direct Program Control Adapter are obtained separately. See #1593 below. Restrictions: May not be mounted behind the following units: 4952A without EC 375810, any mdl 30D or any unit in a Stand-Alone Enclosure (#4520). Field Installation: Yes.

Customer Access Panel - Integrated DI/DO Cable (#1593): Internal cable which connects Integrated Digital Input/Output (#1560) with

Customer Access Panel #1590. Provides both plug and receptacle at Customer Access Panel and connectors at Integrated Digital Input/Output feature. Up to a total of six #1593 and #1594 (NO LONGER AVAILABLE) may be accommodated in each full-width machine. Half-width machines are limited by available feature positions.

Rack Mounting Fixture (#4540): Mounting assembly for half-rack-width units. One rack mounting fixture required to mount one or two half-width units in a 4997 or an EIA standard 19-inch rack enclosure. If only one unit is mounted in #4540, the empty space will be covered with a decorative panel similar to the front covers of S/1 machines. Field Installation: Yes.

5250 Information Display System Attachment Cable (#5760): Provides termination for up to four customer cables (one for each port) to a 5250 Information Display System Attachment Feature (#1210). Cable is 3m (10 ft) long. See M5251, and 5256 pages for connectors for customer cable. Field Installation: Yes.

Attachment Cable (#5780): Provides a twinaxial cable, 6.1m (20 ft) in length, with a Berg connector on one end and a male twinaxial connector on the opposite end. May be used to attach the 5224 or 5225 Printers to Printer Attachment - 5200 Series (#5640). See M5224, 5225 pages for additional cable information.

Cables: Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-Pair Cable: IBM Cabling System components are available for attaching displays and printers (attachment features #1250, #1310), and for interconnecting multiple processors (feature #1400).

For proper identification, installation and application of cable and associated accessories, refer to "IBM Cabling System-Planning and Installation Guide", GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country.

Other cables and accessories for attaching devices are noted below. For the proper identification of the required connectors, see "IBM Series/1 Customer Site Preparation Manual", GA34-0050. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the feature(s).

Cables For S/1 Local Communications Controller #1400

Part Name	IBM No. For Twinaxial Cable		IBM No. For Coax Cable	
	Indoor/Outdoor	Indoor	Indoor	Outdoor
Cable Asmy(1)	4498426	2577672 (5)	1833108 (5)	
Bulk Cable (2)	7362211	0323921 (5)	5252750 (5)	
Connector Kit	4498427 (3)	1836418 (4)	1836419 (4)	

Notes:

1. Cable in specified length with connectors at both ends up to a maximum of 610m (2,000 ft). Multiple assemblies are required for total twinaxial cable lengths of 610m (2,000 ft) to 1,524m (5,000 ft).
2. Cable in specified length without connectors up to a maximum of 610m (2,000 ft). Multiple assemblies are required for total twinaxial cable lengths of 610m (2,000 ft) to 1,524m (5,000 ft).

3. Two connectors (one male and one female).

4. Two connectors (both male).

5. Coax wire is limited to lengths of 610m (2,000 ft) between active S/1 processors and cannot be intermixed with Twinaxial wire in the same segment.

Order specifying P/N and desired length of cable.

3101, 3161, and 3163 Display Station-Cable/Attachment Matrix

Machine	Feat.	3161-All		3163-All	
		Local	Remote (Modem)	3101-All	3161-12
S/1 Processor, or 4959, or 4965	#1310	#2056 (2)	#2057 (2)	12/22	3163-12
	#1610	#2056 (2)	#2057 (2)	Current	3101-
	#2092	#2056 (2)	#2057 (2)	Loop	13/23
	#2096	#2056 (2)	#2057 (2)		RS-422
	#7850	#2064 (1)	#2066		
	#7850	#2065 (2)	#2066		
4987	#4730		#2130 (2)		
	#4731		#2130 (2)		
	#4734			#2066 (1)	
	#4739	#2132 (2)			

Notes:

1. Requires field modification of pin plug-wiring.

2. Prerequisite is 3101 Modem Cable P/N 5640736 or 3161/3163 Modem Cable P/N 6343332.

Cable For Communications and other Features

Cable Code	Cable Description	Feature(s) Used With
#2055	Teletypewriter Cable	#7850
#2056	Asynchronous Local Attachment Comm. Cable	#1310, #1610, #2092, #2096
#2057	EIA Data Set Cable	#1310, #1610, #2074, #2090, #2092, #2094, #2096
#2058	Binary Synchronous Comm/HS Cable (for WE 303 interface)	#2075
#2059	Teletypewriter-Cust. Access Panel Cable	#7850
#2060	Binary Synchronous V.35 HS DDN	

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#2061	(Cable for CCITT V.35 Interface) Feature-Programmable Multiline Current Loop Cable	#2075, #2080 #2096 #2090
#2062	EIA Data Set Cable Full Duplex	
#2064	Teletypewriter Adapter Cable with EIA male connector	#7850
#2065	Teletypewriter Adapter Cable with EIA female connector	#7850
#2066	3101 Display Terminal Current Loop Cable 15 meters (50 feet)	#2096, #7850
#2067	X.21 Attachment Cable 10 meters (32.5 feet)	#2080
#2070	DAA Attachment Cable 6.1 Meters (20 feet)	#7881
#2071	VCA Attachment Cable 6.1 Meters (20 feet)	#7881
#5770	Multifunction Attachment Cable 15 meters (50 feet)	#1310, D02350
#5780	Attachment Cable 6.1 meters (20 feet)	#5640
#5790	IBM Local Network Cabling System 6.1 meters (20 feet)	#1310

Connectors and Tools

Connector	B/M Number
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2 x 8 Berg Connector Kit	8327397
2 x 12 Berg Connector Kit	8327398
2 x 20 Berg Connector Kit	8327399
Berg Crimp Tool (1)	8327400
Amphenol 4-Pos Connector Plug	8327401
AMP 26-Pos Connector Kit	8327402
AMP 160-Pos Connector Kit	8327403
AMP Crimp AMP extractor Tool	8327404
Contntal 56-Pos Connector Kit	8327405
Connector Kit for #1210	6838819
Berg Crimp Tool for #1210 (2)	6838818

Notes:

1. Use only with #24 AWG or #26 AWG wire (0.511mm or 0.40mm)
2. Use only with #18 AWG wire (1.024mm)

Connectors for Feature #1400

Connectors	IBM Number
Twinax Cable-to-Cable	7362230
Coax Indoor Cable-to-Cable	5252643
Coax Outdoor Cable-to-Cable	5252643
Twinax Connector Kit (1)	498427
Coax Indoor Connector Kit (2)	1836418
Coax Outdoor Connector Kit (2)	1836419
Twinax Connector (3)	6838959
Twinax Connector (4)	7362229
Coax Indoor Connector (4)	1836444
Coax Outdoor Connector (4)	1836447
Twinax-Coax Adapter (one) (5)	7363102
Twinax Station Protector Kit (6)	7362426

Notes:

1. One male and one female connector.
2. Two male connectors.
3. One female connector.

4. One male connector.
5. Required when coaxial cable is used to interconnect feature #1400.
6. Two protectors. Required when cable is installed outdoors. One at exit from building and one at entrance to building.

RPQS

The list of RPQs below has been previously bid to IBM customers and prospects. Their inclusion here in no way guarantees future availability. For detailed information on function, limitations, etc., consult:

Special Engineering - Department 837
IBM Canada Limited
1150 Eglinton Avenue East
Don Mills, Ontario, Canada M3C1H7

ITPS: CCDE c/o Ms. B. Boivin.

These RPQs cannot be proposed to a customer without approval to order. See GI section for details on RPQ procedure.

4952, 4953, 4954, 4955, 4956, 4959 and 4965 Auto Call Originate Attachment Card (RPQ D02013): Provides a direct program control EIA RS-366 interface suitable to control auto call data sets.

Auto Call Originate Attachment Cable (RPQ D02014): Provides a cable to connect the Auto Call Originate Attachment Card to one or two auto call data sets.

Auto Call Originate DI/DO Cable (RPQ D02031): Provides a cable to attach to the 16 Digital Input and 16 Digital Output points provided on the Auto Call Originate Attachment Card.

Data Collection Interactive-S/1 (RPQs D02312, D02313, D02314): Provides for the direct attachment of up to 31 5230 Entry Stations for the S/1. Associated PRPQ (P82600) offers user the opportunity to interact with entry stations on realtime basis.

Data Collection Loop Attachment Panel and Cable (RPQs D02355, D02356): Assembly and cable to provide surface of rack adapter with quick disconnect type connection for S/1 data entry loops.

EIA Full-Duplex Data Set Cable (RPQ D02063): Provides a cable to attach a full-duplex RS-232-C or CCITT V.24 data set to two BSC or two SDLC communications lines.

GPIB Adapter (RPQ D02118): Provides a cycle-stealing General Purpose Interface Bus adhering generally to the IEEE Standard 488-1975 and 1978.

GPB Adapter Cable (RPQ D02119): Provides a 4 meter (13 foot) cable to attach RPQ D02118 to an IEEE 488 device.

S/1-to-S/1 (RPQs D02241, D02242): Provides a direct cycle-steal channel attachment between two S/1s at a maximum data rate of 65K bytes per second. (D02241 - Primary, D02242 - Secondary).

Single Line Asynch Single Stop-Bit (RPQ D02236): Provides a single line asynchronous communications adapter with one or two stop-bit capability.

S/3 BSC Attachment (RPQ D02120): Authorizes local or remote attachment of the S/3 Processor to a BSC communication line.

Video Monitor Attach (RPQ D02224): Enables a customer provided video monitor to be attached to the 4979 attachment feature, without the 4979. 3601 BSC Attachment (RPQ D02100): Authorizes local or remote attachment of the 3601-C Finance Communication Controller to a BSC communication line.

3601 SDLC Attachment (RPQ D02122): Authorizes local or remote attachment of the 3601-C Finance Communication Controller to a SDLC communication line.

3684 BSC Attachment (RPQ D02391): Authorizes local or remote attachment of the 3684 Point-Of-Sale Control Unit to a BSC communications line.

3741/5231 BSC Attachment (RPQ D02123): Authorizes remote attachment of the 3741 mdl 2 Data Station, 3741 mdl 4 Programmable Workstation, and 5231 mdl 2 Controller to a BSC communications line.

3777 BSC Attachment (RPQ D02321): Authorizes local or remote attachment of the 3777 Communications Terminal to a BSC communications line. This allows the attachment of the 3203 Line Printer, 2502 Card Reader, and 3521 Card Punch.

4978 Display Station Attachment (RPQ D02038): Provides for S/1 attachment to the 4978 Display Station.

5935-LO3 Start/Stop Attachment (RPQ 8T1040): Provides authorization to attached the 4935-LO3 Banking Terminal via start/stop.

5935-LO3 SDLC Attachment (RPQ 8T1051): Provides authorization to attach the 5935-LO3 via SDLC. There is a SO²C prerequisite for this RPQ.

4955 Processor:

Mdl Change A/B (RPQ D02300): Provides for field change of the 4955 from mdl A to mdl B.

Mdl Change C/D (D02301): Provides for field change of the 4955 from mdl C to mdl D.

4973 Line Printer:

OCR-A Print Belt (D02099): Provides a print belt for the 4973 containing certain OCR-A characters.

4974 Printer:

Forms Cutter Bar (D02018): Provides a manually operated cutter bar which facilitates tearing single or multipart perforated forms within five inches of the first print line.

Tractor/Cutter (D02078): Provides a variable-width forms tractor with a mechanical cutter to separate a single or multipart perforated form within 1.5 inches of the first print line. A field installable version is also available.

Rear Document Insertion (D02331): Provides a removable document insertion device which facilitates use of cut forms in the 4974. A field installable version is also available.

4979 Display Station:

Video Monitor Attachment (D02223): Enables the customer to connect one or more video monitors to duplicate the display image.

4982 Sensor Input/Output Unit:

Analog Input-14 Bits (D02071): Provides a differential analog input with resolution of 13 bits plus sign or 14 bits unipolar.

4987 Programmable Communication Subsystem:

3780 BSC Attachment (D02227): Authorizes local and remote point-to-point attachment of the 3780 Communications Terminal and 3781 Card punch, providing 350 lpm printer, 600 cpm card reader, and 160 cps card punch.

Audio First Line (D02337): Provides the first feature card whereby Touchtone(R) telephones may be used for input to the S/1. The output of the system is audio messages constructed from a digitized vocabulary.

Audio I/O Additional Line (D02338): Provides additional audio lines as described under D02337, up to a maximum of 16 per PCS.

Touchtone is a Registered Trademark of Western Electric Company.

4997 Rack Enclosure:

Noise Reduction (D02162, D02163): Provides audible noise reduction packaging suitable for office environment. Related RPQs are available for most S/1 rack-mounted units.

S/1 Noise Reduction:

Noise Reduction (RPQ's D02162 - D02165, D02168, D02169): Provide noise reduction packaging suitable for office environment. Available on S/1 units except printers.

4962 DISK STORAGE UNIT

PURPOSE

The 4962 is a disk storage unit for Series/1.

MODELS

- | **Model 1 001:** (NO LONGER AVAILABLE) 9.3MB disk unit.
- | **Model 1F 01F:** (NO LONGER AVAILABLE) 9.3MB disk unit with fixed heads and 123KB capacity.
- | **Model 2 002:** (NO LONGER AVAILABLE) 9.3MB disk unit with diskette unit.
- | **Model 2F 02F:** (NO LONGER AVAILABLE) 9.3MB disk unit with fixed heads, 123KB capacity, and diskette unit.
- | **Model 3 003:** (NO LONGER AVAILABLE) 13.9MB disk unit.
- | **Model 4 004:** (NO LONGER AVAILABLE) 13.9MB disk unit with diskette unit.
- | **Limitations:** One 4962 per 4997 model 1, two per 4997 model 2.
- | **Prerequisites:** #3580 (NO LONGER AVAILABLE) for each 4962 and also #3581 required for 4962 models 2, 2F, and 4 on a processor unit, 4959, or 4965.

HIGHLIGHTS

The 4962 is designed for mounting on a 4997 or an EIA standard 19-inch rack enclosure. It is a full-width unit, 19 inches high.

Models 1, 1F, 2, and 2F have two data heads and a capacity of 9,308,160 bytes. Models 3 and 4 have three data heads and a capacity of 13,962,240 bytes. There are 303 data tracks per head, 60 sectors per track, and 256 bytes per sector. Access times are 10 milliseconds minimum, 40 milliseconds average, and 70 milliseconds maximum. Average rotational latency is 10.1 milliseconds. The disk rotates at 2,964 rpm, yielding an instantaneous data rate of 889,000 bytes per second. Models 1F and 2F have eight fixed heads with a data capacity of 122,880 bytes.

Model 2 is similar to model 1, model 2F is similar to model 1F, and model 4 is similar to model 3, except that models 2, 2F, and 4 include diskette units identical in function to the 4964.

Publications: "4962 Disk Storage Unit and 4964 Diskette Unit Description" (GA34-0024).

SPECIFY

Specify codes #9XXX may not be ordered independently.

● Voltage (AC, 1-phase):

50 Hz		60 Hz	
100V	#2804	100V	#2730
110V	#2805	115V	#9901
123.5V	#2811	200V	#2732
200V	#2806	208V	#9902
220V	#2813	230V	#9904
235V	#2814		

● Power Cord: 1.8m (6 ft) cord. Specify #2744 for Canada and #2747 for Japan.

● Machine Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

Diskettes: Models 2, 2F, and 4 use a 2-sided diskette, P/N 2736700. This diskette is initialized for 256 bytes per sector and must be re-initialized for another format. Models 2, 2F, and 4 may be used to reformat the diskette. Diskettes are packaged 10 per box. Minimum order is one box.

4963 DISK SUBSYSTEM

PURPOSE

The 4963 is a medium capacity, disk subsystem for Series/1.

MODELS

- | **Model 23A:** (NO LONGER AVAILABLE). 23MB primary disk unit with fixed heads
- | **Model 23B:** (NO LONGER AVAILABLE). 23MB expansion disk unit with fixed heads
- | **Model 29A:** (NO LONGER AVAILABLE). 29MB primary disk unit
- | **Model 29B:** (NO LONGER AVAILABLE). 29MB expansion disk unit
- | **Model 58A:** 58MB primary disk unit with fixed heads
- | **Model 58B:** (NO LONGER AVAILABLE) 58MB expansion disk unit with fixed heads
- | **Model 64A:** 64MB primary disk unit
- | **Model 64B:** 64MB expansion disk unit

Limitations: The subsystem primary drive must mount in lowest rack position. First expansion unit placed directly above. Third and fourth units in lowest positions of adjacent rack.

Prerequisites: #3590 (see M4959 pages) for each 4963 mdl 23A, 29A, 58A, or 64A plus an available I/O slot in a processor, 4959 I/O expansion unit, or a 4965 I/O expansion unit.

HIGHLIGHTS

High performance disk subsystem featuring multiple microprocessors to both offload the Series/1 processor and optimize disk performance. Each subsystem has one primary drive and may have up to three expansion drives ... mdls may be intermixed. Designed for mounting in a 4997 or an EIA standard 19-inch rack enclosure. Full-width unit 14 inches high. Automatic retries on soft error, automatic seek to alternate sector (one alternate sector per track plus use of spare sectors on tracks in same or adjacent cylinder eliminates seeks to alternate track), automatic seek overlap with read or write, and automatic error handling under subsystem microprocessor control. The microprocessor executes self-test diagnostics on power-up, reset command, and during quiescent periods. A 3-sector speed matching buffer reduces extra revolutions often encountered on multiple sector read or write operations. Multiple subsystems may be attached ... one 4963 Disk Subsystem Attachment (#3590) required for each.

Standard 4963 drives have 64,520,192-byte or 29,327,360-byte capacities. Substitution of eight fixed heads on one data recording surface for one moving head lowers capacity under moving heads to 58,654,720 or 23,461,888 bytes and adds 131,072 bytes under fixed heads. Fixed heads allow faster access to data by eliminating the access arm movement.

Publications: "4963 Disk Subsystem Description", (GA34-0051).

SPECIFY

Specify codes #2XXX, #8XXX, and #9XXX apply to plant orders only --- do not use for MES order.

- Voltage (AC, 1-phase):

	50 Hz	60 Hz
100V	#2804	100V #2730
110V	#2805	115V #9901
123.5V	#2811	200V #2732
200V	#2806	208V #9902
220V	#2813	230V #9904
235V	#2814	

- Power Cord: 1.8 meters (6 feet) long. Specify #2744 for Canada, #2747 for Japan.

- Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		

- Unit Sequence for B Mdl Expansion Drives: Specify #9150 for second unit, #9151 for third unit, #9152 for fourth unit.

- Subsystem Number: Specify #925X. The subsystem number is the same as the subsystem number used with attachment feature #3590 (see M4959 pages). It must be used with each unit in the subsystem.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

4965 STORAGE AND I/O EXPANSION UNIT

THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT

PURPOSE

Provides storage and additional I/O feature locations for S/1.

MODELS

Model 1 001: 1.2MB of diskette storage and four available I/O feature locations with provisions for an optional second 1.2MB diskette drive.

Model 30D 30D: (NO LONGER AVAILABLE) 30MB of disk storage, seven available I/O feature locations with provisions for an optional 1.2MB diskette drive and cache storage.

Model 60D 60D: 60MB of disk storage, seven available I/O feature locations with provision for an optional 1.2MB diskette drive and optional cache storage.

Limitations: The 4999 Battery Backup may not be used with the 4965. Programmable Two-Channel Switch (#7777) is not available on mdls 30D and 60D.

Prerequisites: All mdls are full-width units designed for mounting on support rails (fixed) in a 4997 (see M4997 pages), or EIA standard 19-inch enclosure. Mdls 001, 30D, and 60D can also be mounted in Stand-Alone Enclosure (#4520). #1565 is required in the preceding unit when attaching a 4965 to a 4952, 4953, 4954, 4955, or 4956 Processor or 4959 I/O Expansion Unit or another 4965.

HIGHLIGHTS

Provides multiple functions by combining the I/O expansion capability with a 30MB or 60MB fixed disk with an optional 1.2MB diskette, or a single 1.2MB diskette with a optional second 1.2MB diskette. Data exchange media is compatible with other is compatible with other systems.

Disk Drive Mdls 30D and 60D: Provides a capacity of 30 or 60 megabytes per disk drive. Both mdls have an average access time of 35 milliseconds. Average rotational latency is 9.5 milliseconds. The disk rotates at 3,151 rpm yielding an instantaneous data rate of 1,250,000 bytes per second. A high level of data integrity is maintained by Error Checking and Correcting (ECC) which corrects any error of nine bits or less and any error of 16 bits or less within a 2-byte boundary. Also, ECC will detect up to two 2-byte errors within any 256-byte block.

Cache: The 64 kilobyte cache is microprocessor-controlled and has the potential to significantly improve system performance. Selected data sectors, determined by the cache control algorithm to be probable candidates for system read request, are pre-fetched and stored in cache. The microprocessor monitors its own "hit-ratio" and adjusts to optimize performance. Least-recently-used algorithm eliminates inactive data from cache, as space for new data is required. This allows the disk to dynamically adapt to changes in the jobstream. Performance improvements are application-dependent -- (test cases from a variety of applications thought to be typical have shown improvements in disk throughput ranging from 50% to above 200%. No guarantee of result can be made. Applications which are truly random (test cases found none) or which are heavily write-oriented may experience little or no improvement from the cache function.

Diskette Drive: Diskette drive access time includes 5 milliseconds per track crossed plus 35 milliseconds for head settling. Diskettes rotate at 360 rpm, yielding a data rate of 62,500 bytes per second and an average latency of 83.8 milliseconds. The use of flexible latency of 83.8 milliseconds. The use of flexible diskette storage

provides significant advantages such as low cost, compact size, multiple system functions, ease of media handling and storage, etc. It should be recognized, however, that during recording and reading the read/write head is in contact with the diskette, causing wear over time. Variations in the rate of wear will depend upon the particular operating environment and application characteristics. Care in storage, use, and handling can also affect diskette life. See guidelines in the "IBM Diskette General Information Manual" (GA21-9182). Excessive wear, handling, or contamination can cause possible failures in recording and/or reading. Ultimate wear to some extent dependent upon total usage of individual tracks. Care taken to distribute data, so that accessing occurs over the entire recording surface with about the same frequency, can extend the useful life of the diskette. Actual experience with individual applications and environments will allow development of guidelines as to when the media should be replaced. Unpredictable circumstances, such as contamination or severe handling, can dramatically shorten useful life. For all of the above reasons, consideration should be given to providing an adequate recovery plan.

Diskette Types: Either the 1-sided Diskette 1 or the 2-sided Diskette 2 or Diskette 2D may be used.

Formats: Diskettes 1 or 2 may be initialized for 128-, 256-, or 512-byte sectors. Diskette 2D may be initialized for 256-, 512-, or 1,024-byte sectors.

Diskette Capacity: Capacity is dependent upon type and format. Actual usable capacity is dependent upon programming support and may be less than the amount shown.

Bytes/ Sector	Sectors/ Track *	Diskette Type	Capacity (bytes)
128	26	1	246,272
256	15	1	284,160
512	8	1	303,104
128	26	2	492,544
256	15	2	568,320
512	8	2	606,208
256	26	2D	985,088
512	15	2D	1,136,640
1,024	8	2D	1,212,416

* 74 data tracks per surface; Diskettes 2 and 2D have two surfaces.

Publications:

Mdl 001:

- "4965 Storage and I/O Expansion Unit Description" (GA34-0155)
- "4965 Storage and I/O Expansion Unit Maintenance Information" (SY34-0313)
- "4965 Storage and I/O Expansion Unit Parts Catalog" (S134-0104).

Mdls 30D and 60D:

- "Storage and I/O Expansion Unit Description, Mdls 30D and 60D" (GA34-0254)
- "4965 Storage and I/O Expansion Unit Maintenance Information, Mdls 30D and 60D" (SY34-0313)
- "4965 Storage and I/O Expansion Unit Parts Catalog, Mdl 30D" (S134-0104).

SPECIFY

Unless otherwise indicated these specify features are only available at time of manufacture. Specify codes #2XXX, #8XXX, and #9XXX apply only to plant orders -- do not use for MES orders.

- Power (AC, 1-phase): With 1.8m (6 ft) cord.

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
123.5V #2811	115V #9901
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
235V #2814	208V #9902
240V #2801	220V #2803
	230V #9904
	240V #9914

- Power Cord: Specify #2744 for Canada, #2747 for Japan.
- Nomenclature:

English US #2750
French #2928
German #2929
Italian #2932
Japanese Katakana #2926
Spanish #2931

- For initial system orders including 4997 Rack Enclosures, IBM will locate machines and supply cables as required.
- Processor Sequence: Specify #93BB for sequence number(s) and #9450 for extension of switched I/O channel.

For multiple processor configurations, each processor has been assigned a sequence number, #93BB. In such a system, a 4959 or 4965 may be connected only to a single processor (private I/O). Alternatively, a 4959 or 4965 may contain, or be down a chain of 4050s 4959s or 4965s from a Programmable Two-Channel Switch (#7777) or a Two-Channel Switch (#7900), and is then connected to two processors (shared I/O). Where a 4959 or 4965 contains private I/O, specify the same #93BB as the processor to which it is connected. Where a single #7777 or #7900 connects one or a chain of 4959 or 4965 machines to two processors (a "Y" configuration), specify both associated #93BBs for each 4959 or 4965 containing shared I/O.

In the special case where there are two #7777 or #7900s interconnecting interconnecting four machines, only one #93BB is specified for each 4959 or 4965 containing the shared I/O. This is the #93BB associated with the processor for which primary or normal attachment is desired.

In addition, for each 4959 or 4965 containing shared I/O and not containing a #7777 or #7900, specify #9450 for extension of switched I/O channel.

- Diskette IPL:

Mdl 001:

- #9138 Diskette primary IPL, Optional diskette not IPL device
- #9139 Diskette alternate IPL, Optional diskette not IPL
- #9140 2nd diskette primary IPL, 1st diskette not IPL device
- #9141 2nd diskette alternate IPL, 1st diskette not IPL device
- #9142 1st diskette primary IPL, 2nd diskette alternate
- #9143 2nd diskette primary IPL, 1st diskette alternate
- #9144 No IPL

Mdls 30D or 60D:

- #9148 Diskette primary IPL, Optional diskette not IPL device
- #9149 Diskette alternate IPL, Optional diskette not IPL device
- #9150 Diskette primary IPL, Disk not IPL device
- #9151 Diskette alternate IPL, Disk not IPL device

- #9152 Disk primary IPL, Diskette alternate
- #9153 Diskette primary IPL, Disk alternate
- #9144 No IPL

SPECIAL FEATURES

All channel features which may use a feature position in the 4965 are presented in the "Specification Table" below. To simplify, shorten, and improve the usability of these pages, descriptions of those features which are available on all processors, the 4959, and the 4965 are presented in the M4959 pages. Features unique to this unit or for which there are mdl-dependent considerations are presented below.

Channel Repower (#1565): Located on the preceding unit, and provides channel repower for the 4965 and for the 4959. Required to connect a 4965 to a 4952, 4953, 4954, 4955 and a 4956. A 4965 attached to a 4959 or another 4965 requires #1565 on the preceding 4959 or 4965. Field Installation: Yes.

Series/1 To Personal Computer Channel Attachment Feature (#4000): Provides a Series/1 high speed channel-to-channel gateway to an IBM Personal Computer in a network environment. The Series/1 to PC channel attachment is a microprocessor controlled Series/1 feature card and a PC channel extender card (feature #4000). Series/1 to PC channel attachment cable provides a 20 foot interconnect cable between the Series/1 and PC/PC-XT or PC-AT (feature #4001). Byte wide data transfer occurs at the maximum PC channel rate through the feature's shared data storage area. A communication test diskette supplements the standard Series/1 diagnostics provided with this feature. Service Information: Series/1 warranty and maintenance are applicable. Service for the Series/1 feature card (#4000) PC cable interface (#4001) is available from IBM Customer Engineering. Field Installation: Yes. Limitations: Available only on the 4959, 4965 I/O expansion units and 4954, 4955 and 4956 processors. Prerequisites: Series/1 to PC channel attachment cable, Series/1 (4954, 4955 and 4956 processors), an IBM Personal Computer System (PC/PC-XT/PC-AT) with a keyboard and monitor, and at least one diskette drive. Specify: Series/1 IPL Options: The PC can be designated as the primary, secondary, or non-IPL device.

Function/Description	Code
Primary IPL	#9501
Secondary IPL	#9502
Non-IPL Device (Default)	#9503

Publications:

- "IBM Series/1 to Personal Computer Channel Attachment Description Manual", GA34-0287
- "IBM Personal Computer - Series/1 to Personal Computer Channel Attachment Guide to Operations", SX34-0170
- "IBM Personal Computer - Series/1 to Personal Computer Channel Attachment Hardware Maintenance and Service", SX31-0171

Series/1 to Personal Computer Channel Attachment Cable (#4001): Provides interconnecting cable between the Series/1 feature card and the IBM Personal Computer channel extender card. The Series/1 to PC channel attachment cable is a 20 foot interconnect cable to connect the Series/1 feature card and the PC channel extender card (the Series/1 feature card and the PC channel extender card are both provided by feature code #4000). Series/1 to PC channel attachment cable is a shielded multi-twisted-pair cable and can be cable and can be ordered in a 20 foot length only (feature #4001). Field Installation: Yes. Limitations: Available only on the 4959, 4965 I/O Expansion units and 4954, 4955 and 4956 processors. Expansion units and 4954, 4955 and 4956 processors. Prerequisites: Series/1 to PC channel attachment feature, Series/1 (4954, 4955 processors), an IBM Personal Computer System (PC/PC-XT/PC-AT) with a keyboard and monitor, and at least one diskette drive. Publications: "IBM Series/1 to Personal Computer Channel Attachment Description Manual", GA34-0287.

Diskette Drive (#4100): Provides for a second diskette drive on mdl 001 or a single diskette drive on mdl 30D or 60D. Does not require a feature position. Field Installation: Yes.

Stand-Alone Enclosure (#4520): For the 4965 mdls C, 30D, and 60D. Consists of a 3-sided wrap around cover with decorative, removable, front and rear covers. When connecting a mdl C, 30D, or 60D to a 4965 both in the Stand-Alone Enclosure, specify Stand-Alone Enclosure Cable (#4525). Limitations: Features and devices that interconnect using flat or internal cabling are not supported in the Stand-Alone Enclosure. See Note 4 at the end of the "Specification Table". Field Installation: Yes.

Stand-Alone Enclosure Cable (#4525): (NO LONGER AVAILABLE) Provides a 3.1m (10 ft) external shielded cable group (four cables) between a 4965 in a Stand-Alone-Enclosure (#4520) and a Processor (4952, 4954, or 4956) also in a Stand-Alone Enclosure (#4520) or another 4965 in a Stand-Alone Enclosure (#4520). Field Installation: Yes.

other 4965 in a Stand-Alone Enclosure (#4520). Field Installation: Yes. Prerequisites: #1565.

Cache (#8400): Provides a means of reducing the effective access time of the disk, which can result in a substantial the system level performance improvement (mdls 30D and 60D). The cache option does not require a feature position. Field Installation: No.

Programmable Two-Channel Switch (#7777): (Not available on Mdls 30D and 60D.) See M4959 pages.

Two-Channel Switch (#7900): See M4959 pages.

Specification Table: This table is provided to determine those features that may be desired on the 4965. Locations are expressed as a negative number for availability. A positive number is used for feature requirement. The sum of the availability and requirements numbers must not exceed zero. Field Installation: Yes.

Machine/ Feature/ Number	Feature Positions	Notes
4965-001 Storage and I/O Expansion	-4	
4965-30D		
or 60D		
#1200 Storage and I/O Expansion	-7	
#1200 S/1 - S/370 Channel Attach	+1	(3)
#1205 4966 Diskette Magazine Unit Attach	+1	(3)
#1210 5250 Info Display System Attach	+2	(1)
#1215 4969 Magnetic Tape Subsystem Attach	+1	(3)
#1220 4968 Autoload Streaming Magnetic Tape Unit Attachment	+1	(3)
#1250 Multidrop Workstation Attachment	+1	
#1300 Programmable Communications Subsystem Controller	+2	(1,3)
#1310 Multifunction Attach	+1	
#1400 Series/1 Local Comm Controller	+1	
#1560 Intgrtd Digital I/O Non-Isolated	+1	
#1565 Channel Repower	+1	
#1595 Channel Socket Adapter (#1595 is NO LONGER AVAILABLE)	+1	
#1610 Async Comm Single Line Control	+1	
#2074 Binary Sync Comm Single Line Control	+1	
#2075 Binary Sync Comm Single Line Control, High-Speed	+1	
#2080 Sync Comm Single Line Control, High-Speed	+1	
#2090 Sync Data Link Control	+1	
#2091 Async Comm 8-Line Control	+1	
#2092 Async Comm 4-Line Adapter	+1	(2)
#2093 Binary Sync Comm 8-Line Control	+1	
#2094 Binary Sync Comm 4-Line Adapter	+1	(2)
#2095 Feature-Programmable 8-Line Comm Control	+1	
#2096 Feature-Programmable 4-Line Comm Adapter	+1	(2)
#3580 4962 Disk Storage Unit Attach	+1	(3)
#3581 4964 Diskette Unit Attach	+1	(3)
#3585 4979 Display Station Attach	+1	
#3590 4963 Disk Subsystem Attach	+1	(3)
#3595 4967 High Performance Disk Subsystem Attachment Mdl 2CA	+1	(3)
#3596 4967 High Performance Disk Subsystem Attachment Mdl 3CA	+1	(3)
#5430 Customer Direct Program Control Adapter (#5430 is NO LONGER AVAILABLE)	+1	
#5620 4974 Printer Attach	+1	
#5630 4973 Line Printer Attach	+1	
#5640 Printer Attachment - 5200 Series	+1	
#6305 4982 Sensor I/O Unit Attach	+1	(3)
#7840 Timers	+1	
#7850 Teletypewriter Adapter	+1	(2)
#7880 Telephone Comm Controller	+1	
#7881 Telephone Comm Adapter	+1	(2)
RPQ D02038 4978 Display Station Attach	+1	
RPQ D02118 GPIB Adapter	+1	

MACHINES

RPQ	D02241 S/1 Attach	+1
RPQ	D02242 S/1 Attach	+1

Notes:

1. Must be contiguous I/O feature positions.
2. Must be contiguous I/O feature position with its associated controller.
3. Not supported in the Stand-Alone Enclosure due to flat or internal cabling.

Auxiliary Features, Cables, Connector Kits: Certain devices, cables, etc., involved in system installation are available and may be ordered with this unit. For details see "Accessories" in M4959 pages.

MODEL CONVERSIONS

Model Upgrade 30D to 60D: All conversions may be field installed. Any model upgrade that involves a disk storage capacity change requires replacement of the disk storage mechanism. Adequate provision must be made for retaining the data contained on the replaced disk mechanism and elimination of user proprietary information.

The upgrade purchase price for model conversion is greater than the purchase price differentials. The customer should carefully evaluate future requirements when purchasing a system. Replaced parts from any model conversion that includes a disk storage capacity change become the property of IBM.

Model Downgrades: Conversion from model 60D to 30D is not recommended.

ACCESSORIES

Frame Stand (P/N 6841365): Provides a steel stand capable of supporting a 4965 mdl 001, 30D or 60D, and a 4975 Printer. The stand rests on glides and comes in a pebble gray color only.

SUPPLIES

Diskettes: The 4965 uses either the 2-sided Diskette 2, or the 1-sided Diskette 1. Diskette 1 is prepared in 128, 256, or 512 bytes per sector. Diskette 2 is prepared in 128 or 256 bytes per sector formats. The 4965 may be used to reformat the diskettes. Diskettes are packaged 10 per box. Minimum order is one box.

IBM SERIES/1 4965 STORAGE AND I/O EXPANSION UNIT, MODEL E00

PURPOSE

IBM Series/1 4965 Storage and I/O Expansion Unit Model E00 provides new, low cost expansion capability for the Series/1 4954, 4955, and 4956 processor family. The 4965 Model E00 offers seven additional I/O feature locations, one 40MB 5-1/4 inch disk plus two optional 40MB disks and an optional 1.2MB diskette drive. The disk and diskette drive are the same units incorporated in the 4956 processor models G10 and H10.

MODELS

Model E00

Limitations: Other models of the 4965 cannot be upgraded to a Model E00. The following features are not supported: #4100 Diskette Drive, eight inches; #4520, #4521 Stand-alone Enclosure; #4525 Stand-alone Enclosure Cable; #6400 Cache.

Prerequisites: Channel repower (#1565) must be ordered in the preceding unit when attaching a 4965 to a Series/1 4954, 4955 and 4956 processors (with a minimum main storage of 192KB), another 4965 or a 4959 I/O Expansion Unit.

A full width unit designed for mounting on support rails (fixed) in a 4997 (see 4997 product description), or EIA standard 19-inch enclosure.

Customer Setup (CSU): No

HIGHLIGHTS

- Seven Additional I/O Feature Locations
- Disk Expansion Capability
- Optional Second and Third Disk
- High Frequency Switching Power Supply
- 400KB Dynamic and Self-Optimizing Cache
- Optional Diskette Drive

DESCRIPTION

Provides multiple functions by combining the I/O expansion capability and an integrated 40MB (5-1/4 inch) disk with an optional second and third 40MB (5-1/4 inch) and optional 1.2MB (5-1/4 inch) diskette.

5-1/4 Inch Disk Drive: The disk drives used within the Model E00 are 40 megabyte (formatted) random direct access storage devices (DASD) that uses four fixed 5-1/4 inch disk platters as storage media. The drives contain read/write and control/servo electronics, a DC spindle motor, a track positioning actuator, an air filtration system, a sealed disk enclosure, and seven read/write heads. The disk drive features an industry standard ST506/ST412 interface, buffered seek, microprocessor control, closed loop actuator servo, rotary voice coil motor drive actuator, automatic actuator lock, dedicated head landing zone and a dynamic spindle brake.

The major specifications for the disk drive are:

- Data Transfer Rate - 0.625 megabytes per second
- Rotational Speed - 3600 RPM
- Average Latency - 8.33 milliseconds
- Single Cylinder Seek Time - 8 milliseconds (average)
- Average Seek (Weighted) - 40 milliseconds (maximum)

Cache: The 400-kilobyte disk cache is microprocessor controlled and has the potential to improve system performance. Selected data sectors, determined by the cache control algorithm to be probable candidates for system read request, are prefetched and stored in cache. The microprocessor monitors its own "hit ratio" and adjusts to optimize performance. Least recently used algorithm eliminates inactive data from cache, as space for new data is required. This allows the disk to dynamically adapt to change in the jobstream. Performance improvements are application dependent.

5-1/4 Inch Diskette Drive: The diskette drive used within the Model E00 is a 1.2 megabyte 5-1/4 inch form factor and provides interchange capability with current 96 track per inch diskettes formatted with 80 tracks for both reading and writing double-sided media. Forty-eight TPI diskettes can be read, although interchangeability between the 96 TPI and 48 TPI drives is limited to writing diskettes in a 48 TPI drive and then reading those diskettes in a 96 TPI drive (i.e., the 96 TPI drive does not support writing 48 TPI diskettes to be read by 48 TPI drives).

Access time includes 3 milliseconds per track crossed plus 15 milliseconds for head settling. Diskette rotates at 360 RPM, yielding a data rate of 62,500 bytes per second and average latency of 83 milliseconds. The use of Flexible Diskette Storage provides significant advantages such as low cost, compact size, multiple system functions, ease of media handling and storage.

Power Supply: The power supply for the Model E00 is a universal high frequency switching supply that is capable of handling input voltages from 100 to 240V AC.

Publications:

- GA34-0805 - IBM Series/1 4965 Storage and I/O Expansion Unit Description, Model E00
- SY34-0503 - IBM Series/1 4965 Storage and I/O Expansion Unit Maintenance Information, Model E00
- S134-0020 - IBM Series/1 4965 Storage and I/O Expansion Unit Parts Catalog, Model E00

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture. Specify codes (#2XXX, #8XXX and #9XXX) apply to plant orders only -- do not use on MES orders.

The Model E00 uses a single switching power supply that has a two-position switch on the rear, 115 for low range 90 to 137V AC and high range 230 for 180 to 259V AC. The only requirement to change voltages is the correct switch position (115 for low range and 230 for the high range) and the proper line cord to match the wall receptacle. The Model E00 may be incorporated with peripheral devices already installed or mounted in a 4997 Rack Enclosure with other machine types, therefore the voltage must be specified in order to be consistent.

- Power (AC, 1 phase): With 1.8m (6 ft) cord

50 Hz		60 Hz	
100V	#2804	100V	#2730
110V	#2805	110V	#2822
123.5V	#2811	115V	#9901
200V	#2806	120V	#9911
220V	#2813	127V	#2823
230V	#2821	200V	#2732
235V	#2814	208V	#9902
240V	#2801	220V	#2803
		230V	#9904
		240V	#9914

- Power Cord #2744 for Canada, #2747 for Japan

● Machine Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Japanese	
German	#2929	Katakana	#2926
		Spanish	#2931

Industrial Automation Systems Specify

#9010 Plant Floor Systems: Collection or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reprint, etc. as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also, includes power management systems.

- For initial system orders including 4997 Rack Enclosures, IBM will locate machines and supply cables as required.
- Processor Sequence: Specify #93BB for sequence number(s) and #9450 for extension of switched I/O channel.

For multiple processor configurations, each processor has been assigned a sequence number, #93BB. In such a system, a 4959 or 4965 may be connected only to a single processor (private I/O). Alternatively, a 4959 or 4965 may contain, or be down a chain of 4959s or 4965s from a Programmable Two-Channel Switch (#7777) or a Two-Channel Switch (#7900), and is then connected to two processors (shared I/O). Where a 4959 or 4965 contains private I/O, specify the same #93BB as the processor to which it is connected. Where a single #7777 or #7900 connects one or a chain of 4959 or 4965 machines to two processors (a "Y" configuration), specify both associated #93BBs for each 4959 or 4965 containing shared I/O.

In the special case where there are two #7777 or #7900s interconnecting four machines, only one #93BB is specified for each 4959 or 4965 containing the shared I/O. This is the #93BB associated with the processor for which primary or normal attachment is desired.

In addition, for each 4959 or 4965 containing shared I/O and not containing a #7777 or #7900, specify #9450 for extension of switched I/O channel.

● IPL

MDL E00

- #9148 Disk Primary IPL, Optional Diskette not IPL Device
- #9149 Disk Alternate IPL, Optional Diskette not IPL Device
- #9151 Optional Diskette Alternate IPL, Disk not IPL Device
- #9152 Disk Primary IPL, Optional Diskette Alternate
- #9153 Optional Diskette Primary IPL, Disk Alternate
- #9144 No IPL

SPECIAL FEATURES

All channel features which may use a feature position in the 4965 are presented in the "Specification Table" below. To simplify, shorten, and improve the usability of these pages, descriptions of those features which are available on all processors, the 4959, and the 4965 are presented in the M4959 pages. Features unique to this unit or for which there are model-dependent considerations are presented below.

Channel Repower (#1565): Located on the preceding unit, and provides channel repower for the 4965 and for the 4959. Required to connect a 4965 to a 4954, 4955, and a 4956. A 4965 attached to a 4959 or another 4965 requires #1565 on the preceding 4959 or 4965. Field Installation: Yes.

Series/1 To Personal Computer Channel Attachment Feature (#4000): Provides a Series/1 high speed channel-to-channel gateway to an IBM Personal Computer in a network environment. The

Series/1 to PC channel attachment is a microprocessor controlled Series/1 feature card and a PC channel extender card (feature #4000). Series/1 to PC channel attachment cable provides a 20 foot interconnect cable between the Series/1 and PC/PC-XT or AT (feature #4001). Byte wide data transfer occurs at the maximum PC channel rate through the feature's shared data storage area. A communication test diskette supplements the standard Series/1 diagnostics provided with this feature. Service Information: Series/1 warranty and maintenance are applicable. Service for the Series/1 feature card (#4000) PC cable interface (#4001) is available from IBM National Service Division. Field Installation: Yes. Limitations: Available only on the 4959, 4965, I/O expansion units and 4954, 4955, and 4956 processors. Prerequisites: Series/1 to PC channel attachment cable, Series/1 (4954, 4955 and 4956 processors), and IBM Personal Computer System (PC/PC-XT/AT) with a keyboard and monitor and at least one diskette drive. Specify: Series/1 IPL Options: The PC can be designated as the primary, secondary, or non-IPL device.

● Function/Description

- Primary IPL, #9501
- Secondary IPL, #9502
- Non-IPL Device (Default), #9503

● Publications:

- GA34-0287 - IBM Series/1 to Personal Computer Channel Attachment Description Manual
- SX34-0170 - IBM Personal Computer - Series/1 to Personal Computer Channel Attachment Guide to Operations
- SX31-0171 - IBM Personal Computer - Series/1 to Personal Computer Channel Attachment Hardware Maintenance and Service"

Series/1 to Personal Computer Channel Attachment Cable (#4001): Provides interconnecting cable between the Series/1 feature card and the IBM Personal Computer channel extender card. The Series/1 to PC channel attachment cable is a 20 foot interconnect cable to connect the Series/1 feature card and the PC channel extender card (the Series/1 feature card and the PC channel extender card are both provided by feature code #4000). Series/1 to PC channel attachment cable is a shielded multi-twisted-pair cable and can be ordered in a 20 foot length only (feature #4001). Field Installation: Yes. Limitations: Available only on the 4959, 4965, I/O Expansion Units and 4954, 4955, and 4956 processors. Prerequisites: Series/1 to PC channel attachment feature, Series/1 (4954, 4955 and 4956 processors), an IBM Personal Computer System (PC/PC-XT/AT) with a keyboard and monitor, and at least one diskette drive. Publications: "IBM Series/1 to Personal Computer Channel Attachment Description Manual", GA34-0287.

Second Disk Drive (#4115): Provides for a second 40MB disk drive. Does not require a feature position. Field Installation: Yes.

Third Disk Drive (#4116): Provides for a third 40MB disk drive. The cables and connectors are different between the second and third disk drive. Does not require a feature position. Field Installation: Yes.

Optional Diskette Drive (#4117): Provides for a 5-1/4 inch diskette drive on the Model E00. Does not require a feature position. Field Installation: Yes.

Programmable Two-Channel Switch (#7777): See M4959 pages.

Two-Channel Switch (#7900): See M4959 pages.

Specification Table: This table is provided to determine those features that may be desired on the 4965. Locations are expressed as a negative number for availability. A positive number is used for feature requirement. The sum of the availability and requirements numbers must not exceed zero. Field Installation: Yes.

MACHINE/ FEATURE/ NUMBER		FEATURE POSITIONS	NOTES
4965-E00	Storage and I/O Expansion Unit	-7	
1200	S/1 - S/370 Channel Attach	+1	
1205	4966 Diskette Magazine Unit Attach	+1	
1210	5250 Info Display System Attach	+2	
1220	4968 Autoload Streaming Magnetic Tape Unit Attachment	+1	
1250	Multidrop Workstation Attachment	+1	
1300	Programmable Communications Subsystem Controller	+2	
1310	Multifunction Attach	+1	
1400	Series/1 Local Comm Controller	+1	
1560	Intgrtd Digital I/O Nonisolated	+1	
1565	Channel Repower	+1	
1610	Async Comm Single Line Control	+1	
2074	Binary Sync Comm Single Line Control	+1	
2075	Binary Sync Comm Single Line Control, High Speed	+1	
2080	Sync Comm Single Line Control, High Speed	+1	
2090	Sync Data Link Control	+1	
2091	Async Comm 8 Line Control	+1	
2092	Async Comm 4 Line Adapter	+1	(2)
2093	Binary Sync Comm 8 Line Control	+1	
2094	Binary Sync Comm 4 Line Adapter	+1	(2)
2095	Feature Programmable 8 Line Comm Control	+1	
2096	Feature Programmable 4 Line Comm Adapter	+1	(2)
3581	4964 Diskette Unit Attach	+1	
3585	4979 Display Station Attach	+1	
3590	4963 Disk Subsystem Attach	+1	
3595	4967 High Performance Disk Subsystem Attachment Mdl 2CA	+1	
3596	4967 High Performance Disk Subsystem Attachment Mdl 3CA	+1	
4000	Series/1 To Personal Computer Channel Attachment Feature		
5640	Printer Attachment - 5200 Series	+1	
6305	4982 Sensor I/O Unit Attach	+1	
7840	Timers	+1	
7850	Teletypewriter Adapter	+1	(2)
7880	Telephone Comm Controller	+1	
7881	Telephone Comm Adapter	+1	(2)
RPQ	D02038 4978 Display Station Attach	+1	
RPQ	D02118 GPIB Adapter	+1	
RPQ	D02241 S/1 Attach	+1	
RPQ	D02242 S/1 Attach	+1	

Notes:

1. Must be contiguous I/O feature positions.
2. Must be contiguous I/O feature position with its associated controller.

Auxiliary Features, Cables, Connector Kits: Certain devices, cables, etc., involved in system installation are available and may be ordered with this unit. For details see "Accessories" in M4959 pages.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

4967 HIGH PERFORMANCE DISK SUBSYSTEM

PURPOSE

High performance, cached, large capacity, fast access, high data rate, general purpose, disk subsystem for Series/1.

MODELS

Model 2CA: 200MB Primary Disk Unit

Model 2CB: 200MB Expansion Disk Unit

Model 3CA: 358MB Primary Disk Unit

Model 3CB: 358MB Expansion Disk Unit

Prerequisites: #3595 for each 2CA subsystem and #3596 for each 3CA subsystem in a processor unit, or in a 4959 Input/Output Expansion Unit, or in a 4965 Storage and Input/Output Expansion Unit.

Limitations: One 4967 mdl 2CA primary unit and up to three 4967 mdl 2CB expansion drives may be attached via one 4967 High Performance Disk Subsystem Attachment (#3595), and one 4967 mdl 3CA primary unit and up to three 3CB expansion drives may be attached via one 4967 High Performance Disk Subsystem Attachment (#3596). See M4959 pages.

Two I/O addresses are required if one or two drives are attached, four addresses if three or four drives are attached. The first 4967 drive must mount 5-1/4 inches from the bottom of the rack. The second 4967 drive is installed directly above the first. Third and fourth units mount in the same positions of the adjacent rack. Feature #3595 or #3596 may not be installed in a 4952 mdl A or 4954 mdl A. See "Customer Site Preparation Manual" (GA34-0050) for positioning requirements.

HIGHLIGHTS

High performance disk subsystem featuring multiple microprocessors to offload the Series/1 processor and optimize disk performance. Each subsystem has one primary drive and may have up to three expansion drives.

The 384 kilobyte cache is microprocessor controlled and has the potential to significantly improve system performance. Selected data sectors, determined by the cache control algorithm to be probable candidates for system read request, are pre-fetched and stored in the cache. The microprocessor monitors its own "hit-ratio" and adjusts to optimize performance. Least-recently-used algorithm eliminates inactive data from cache, as space for new data is required. This allows the 4967 to dynamically adapt to changes in the jobstream. Performance improvements are application dependent. Test cases from a variety of applications thought to be typical have shown improvements in disk throughput ranging from 50% to above 200%. However, no guarantee of result can be made. Applications which are truly random (test cases found none) or which are heavily write-oriented may experience little or no improvement from the cache function. In such cases, the standard performance parameters of 25 milliseconds average access time and 10.0 milliseconds latency are seen. Cache functions are transparent to programming. During a write operation data is placed in cache after being written to the disk.

Further 4967 features include automatic retries on soft error, automatic seek to alternate sector (always in same cylinder; eliminates seek to alternate track), automatic seek overlap with read or write. Error correction code (ECC) mechanism corrects the most common form of disk read errors and detects all uncorrectable forms. Up to

four drives (1,432 megabytes) capacity per subsystem. Multiple subsystems may be attached; one per 4967 High Performance Disk Subsystem Attachment (#3595 or #3596). Each subsystem has cache (384KB). Designed for mounting in a 4997 or an EIA standard 19-inch rack enclosure. Full-width unit.

Publications: "IBM Series/1 4967 High Performance Disk Subsystem - Attachment Feature Description" (GA34-0227).

SPECIFY

Unless indicated otherwise, these specify features are available only at the time of manufacture. Specify codes #2XXX, #8XXX and #9XXX apply to plant orders only; do not use on MES orders.

-
-
-
- Subsystem Number: One subsystem number, in sequence, for each #3595. See M4959 pages.

#924X, where X is 1 through 8.

Number of drives in this (#924X) subsystem:

#9182 - One or two drives attached.
#9183 - Three or four drives attached.

Unit sequence for expansion drives in this (#924X) subsystem:

#9185 - First expansion drive.
#9186 - Second expansion drive.
#9187 - Third expansion drive.

- Subsystem Number: One subsystem number, in sequence, for each #3596. See M4959 pages.

#923X, where X is 1 through 8.

Number of drives in this (#923X) subsystem:

#9192 - One or Two Drives Attached
#9193 - Three or Four Drives Attached

Unit sequence for expansion drives in this (#923X) subsystem:

#9195 - First Expansion Drive
#9196 - Second Expansion Drive
#9197 - Third Expansion Drive

IPL:

#9164 - Primary IPL First Drive
#9165 - Alternate IPL First Drive
#9166 - Primary IPL Second Drive
#9167 - Alternate IPL Second Drive

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

4968 AUTOLOAD STREAMING MAGNETIC TAPE UNIT

PURPOSE

Provides fast, convenient save/restore for medium to large Series/1 and System/88 DASD as well as limited performance magnetic tape processing capabilities.

MODELS

Model 1AS: Attaches only to the Series/1. Automatic loading, writes 160K bytes per second in streaming mode at 50 ips. Writes ANSI compatible phase encoded 1600 bpi at 25 and 100 ips and noncompatible 3200 bpi at 50 ips. Up to 25 ips read/write operation at 1600 bpi in limited performance start/stop mode. Capacity per 2,400 foot tape reel exceeds 70MB (at 3200 bpi).

Model 2AS: Attaches only to the System/88. Automatic loading, writes 160K bytes per second in streaming mode at 50 ips. Writes ANSI compatible phase encoded 1600 bpi at 25 and 100 ips and noncompatible 3200 bpi at 50 ips. Up to 25 ips read/write operation at 1600 bpi in limited performance start/stop mode. Capacity per 2,400 foot tape reel exceeds 70MB (at 3200 bpi).

Model 1AS Prerequisites: Series/1 feature #1220 in a processor, 4959 I/O Expansion Unit or 4965 I/O Expansion Unit. See M4959 pages for description of #1220 special feature. 128KB storage to ensure streaming on quiescent system under EDX. 4968 Diagnostic Package requires 32KB or larger processor storage capacity.

Model 2AS Prerequisites: System/88 processor feature #1100. See System/88 processor sales pages for details. Mounting space inside a 4575 Processor or 4577 Expansion Cabinet.

Limitations: Each #1100 (System/88) or #1220 (Series 1) controls only one tape drive.

HIGHLIGHTS

Key parameters of save/restore are speed, capacity, and convenience — 4968 has these attributes:

- **Speed:** In streaming write mode at 50 ips data rate is 160KB per second. 4968 will save 70MB in approximately 10 minutes, 200MB in approximately 30 minutes, exclusive of tape handling. Software is designed to ensure streaming on a quiescent system in a save operation.
- **Capacity:** In the 3200 bpi mode each 2,400 foot tape reel has a capacity of approximately 70MB. Saves 40 percent of 200MB on a single reel, full 200MB on three reels.
- **Convenience:** Autoload eliminates tape threading by the operator. Autoload plus large per reel tape capacity make operator convenience a key 4968 highlight. The autoload mechanism features self-seating, self-locking tape hub and tape reel upside-down detect. Software support for save/restore operations minimizes operator intervention on single or multiple reel operations. Designed for mounting in a 4575, 4577, 4997-2 or an EIA standard 19-inch rack enclosure. Full-width unit, 8.5 inches high.

Publications

- IBM Series/1 4968 Autoload Streaming Magnetic Tape Unit Description Manual, GA34-0263.

SPECIFY

Model 1AS

- **Voltage (AC, 1-phase):** With a 1.8m (6 ft) cord.

50 Hz		60 Hz	
100V	#2804	100V	#2730
110V	#2805	110V	#2822
200V	#2806	115V	#9901
220V	#2813	120V	#9911
230V	#2821	127V	#2823
235V	#2814	200V	#2732
240V	#2801	208V	#9902
		220V	#2803
		230V	#9904
		240V	#9914
- **Power Cord:** Specify #2744 for Canada, #2747 for Japan.
- **Nomenclature:**

US English	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		

Model 2AS

- The 4968 Model 2AS voltage specified must match the voltage of the 4575 or 4577 in which the 4968 will be located.
- **Voltage (AC, 1-phase):** With a 1.8m (6 ft) cord.

50 Hz		60 Hz	
200V	#2806	120V	#9911
220V	#2813	200V	#2732
230V	#2821	208V	#9902
240V	#2801	220V	#2803
		240V	#9914
- **Power Cord:** Specify #2744 for Canada, #2747 for Japan.
- **Machine Nomenclature:** US English #2750

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

4969 MAGNETIC TAPE SUBSYSTEM

PURPOSE

The 4969 provides magnetic tape units and controller for Series/1.

MODELS

Model 4D 04D: (NO LONGER AVAILABLE) 36 or 72KBps, 45 ips, dual density 800 bpi NRZI or 1600 bpi PE

Model 4N 04N: (NO LONGER AVAILABLE) 36KBps, 45 ips, 800 bpi NRZI

Model 4P 04P: (NO LONGER AVAILABLE) 72KBps, 45 ips, 1600 bpi PE

Model 7D 07D: (NO LONGER AVAILABLE) 60 or 120KBps, 75 ips, dual density 800 bpi NRZI or 1600 bpi PE

Model 7N 07N: (NO LONGER AVAILABLE) 60KBps, 75 ips, 800 bpi NRZI

Model 7P 07P: (NO LONGER AVAILABLE) 120KBps, 75 ips, 1600 bpi PE

Subsystem Configurations:

Primary Unit	Features Required	Additional Units
4D	#1550*	4D, 4N, or 4P (1, 2, or 3 units - any mix)
4N	#1540*/#1550*	4N (1, 2, or 3 units)
4P	#1545*/#1550*	4P (1, 2, or 3 units)
7D	#1550*	7D, 7N, or 7P (1, 2, or 3 units - any mix)
7N	#1540*/#1550*	7N (1, 2, or 3 units)
7P	#1545*/#1550*	7P (1, 2, or 3 units)

* NO LONGER AVAILABLE

Limitations: Controller features (#15XX) are not field installable. Recommended for field installation only when factory mounted on 4997 mdl 2. For installation on existing customer-owned 4997 mdl 2 or EIA standard enclosures, see IBM Series/1 Customer Site Preparation Manual (GA34-0050). A maximum of four tape units per 4969 Magnetic Tape Subsystem Attachment (#1215) is allowed. All units within a subsystem must be the same speed. Each unit in the subsystem must be mounted immediately alongside, above, or below the previous unit due to cabling restrictions. Air conditioned with year-round humidity control. Mdls 7D, 7N (NO LONGER AVAILABLE), and 7P (NO LONGER AVAILABLE) (vacuum column) have an altitude limit of 1,524m (5,000 ft). The 4969 may not be installed on a 4997 model 1.

Prerequisites: One 4969 Magnetic Tape Subsystem Attachment (#1215) on a processor unit, 4959, or 4965 for each 4969. For primary unit (first in a subsystem), a controller #1540 (NO LONGER AVAILABLE), #1545 (NO LONGER AVAILABLE), or #1550 (NO LONGER AVAILABLE) must be included. Requires 28 inches of available rack space on 4997 model 2 enclosure or customer-owned EIA standard 19-inch enclosure. Requires additional 5-1/4 inches of air space above the unit when mounted on top of the 4997. See "Customer Site Preparation Manual" (GA34-0050) for details.

HIGHLIGHTS

- The 4969 is designed for mounting on a 4997 mdl 2 or an EIA standard 19-inch rack enclosure. It is a full-width unit, 28 inches high.
- Tape speeds of 45 and 75 ips, NRZI (800 bpi) and PE (1600 bpi), and dual density units are available. Program-selectable density on dual density models. Single density add-on units may be attached to a dual density primary unit of the same speed. Provision for marginal data recovery. Simplified tape threading path. Subsystem consists of one primary unit and up to three additional units of the same speed.

	Mdls 4D*, 4N*, 4P*-	Mdls 7D*, 7N*, 7P*-
Tape Buffer	Tension Arm	Vacuum Column

Nominal read/write access time	8.3ms	5.3ms
Nominal IBG	0.6 in.	0.6 in.
Nominal rewind time	3.2 min.	2.4 min.
Nominal tape speed	45 ips	75 ips

* NO LONGER AVAILABLE

Publications: "4969 Magnetic Tape Subsystem Description" (GA34-0087).

SPECIFY

- Specify codes #9XXX may not be ordered independently.
- Voltage (AC, 1-phase):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	208V #9902
220V #2813	230V #9904
235V #2814	
- Power Cord: 1.8m (6 ft) cord, specify #2744 for Canada and #2747 for Japan.
- Machine Nomenclature:

English US #2750	Italian #2932
French #2928	Spanish #2931
German #2929	
- Subsystem Number: Specify #926X for subsystem (group) number, where X is a number 1 through 9.
- Unit Sequence for B Mdl Expansion Drives: Specify #9101 for the first magnetic tape in a subsystem, #9102 for the second, #9103 for the third, or #9104 for the fourth.

- Additional Units: For second, third, or fourth unit, specify #9271 if preceding unit is NRZI or dual, or #9272 if preceding unit is PE.
- Unit Mounting: Specify #9273 for unit to be factory-mounted on a 4997 mdl 2, or #9274 for unit to be in a shipping frame, pallet-mounted. Field Installation: Not recommended.

SPECIAL FEATURES

Controller for 800 bpi, NRZI Unit Mdls 4N and 7N (#1540): (NO LONGER AVAILABLE) Mounts on primary drive and supplies formatting and control function for primary and up to three additional 800 bpi NRZI units of the same speed.

- | **Controller for 1600 bpi, PE Unit Mdls 4P and 7P (#1545):** (NO LONGER AVAILABLE) Mounts on primary drive and supplies formatting and control functions for primary and up to three additional 1600 bpi PE units of the same speed.

Controller for Dual Density Units, All Mdls (#1550): (NO LONGER AVAILABLE) Mounts on primary unit and supplies formatting and control functions for primary and up to three additional units of the same speed and either of the supported formats.

MODEL CONVERSIONS (NONE)**ACCESSORIES (NONE)****SUPPLIES**

Tapes and Reels: The following tapes and reels may be used: IBM Series 500, IBM Heavy Duty, IBM Dynexcel, or formulations which meet the tape and reel criteria in Tape Specifications (GA32-0006). Note: IBM tapes other than those above do not provide adequate reliability and should not be used.

4971 PRINTER

(NO LONGER AVAILABLE)

PURPOSE

The 4971 is a printer for attachment to the 4950 System Unit.

MODELS

Model 1 001

Model 2 002: See "Specify".

Model 3 003: See "Specify".

Prerequisites: A Monochrome Display and Printer Adapter card feature (#4900) for attachment of the first printer. A second printer may be attached with an optional Printer Adapter Card feature (#5200). A 1.8m (6 ft) Communications Adapter Cable feature (#5612) attaches the printer to the adapter card.

Customer Setup (CSU): All models of the 4971 are designated as Customer Setup Units (CSU) thus offering the customer availability and relocation flexibility.

Customer responsibilities are set forth in "IBM 4971 Unpack and Setup Instructions", GA34-0285. For additional information on CSU, contact IBM.

HIGHLIGHTS

- The 4971 is a wire matrix table-top printer providing bi-directional printing at a maximum speed of 120 characters per second and emphasized printing at half normal speed. The 4971 has two program-selectable functions:
 - Line spacing of 1/6 in., 1/8 in, N/144 in. (N = 0 - 99).
 - Horizontal print density of 5 to 17 characters per inch.

- The printer can use single-sheet or fanfold paper from 112mm (4.5 in.) to 254mm (10 in.) wide. An original plus two carbon copies can be made.

Publications:

- "IBM Series/1 4950 Guide to Operations", SX34-0148
- "IBM Series/1 4950 Maintenance Information Manual", SX34-0149.

SPECIFY

- Voltage (AC, 1-phase, 60 Hz): #9901 for 115V.
- Voltage (AC, 1-phase, 50/60 Hz): Order Mdl 2 for 220V with 1.8m (6 ft) cord; order Mdl 3 for 240V with 1.8m (6 ft) cord

SPECIAL FEATURES

Printer Cable Feature (#5612): A 1.8m (6 ft) cable mandatory to attach the 4971 Printer to the 4950 S/1 System Unit.

OPTIONAL FEATURES

Printer Stand (#5614)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

4973 LINE PRINTER

PURPOSE

The 4973 is a line printer for Series/1.

Japanese English	#2955
Japanese Katakana	#2973
Spanish	#2960
Spanish Speaking	#2969

MODELS

Model 1 001: (NO LONGER AVAILABLE) 150 lpm (nominal)

Model 2 002: (NO LONGER AVAILABLE) 400 lpm (nominal speed)

Prerequisites: #5630 (NO LONGER AVAILABLE) on a processor unit, 4959, or 4965.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

HIGHLIGHTS

- The 4973 is a free-standing impact printer complete with base.
- Mdl 1 prints 155 lpm maximum speed with 48-character set, 120 lpm with 64-character set, or 80 lpm with 96-character set.
- Mdl 2 prints 414 lpm maximum speed with 48-character set, 300 lpm with 64-character set, or 235 lpm with 96-character set.
- Included as standard is one interchangeable print belt (48-, 64-, or 96-character sets). See "Specify".
- A variable-width forms tractor for feeding continuous forms up to 15 inches overall width, printer forms control, forms stand, and paper jam detection are provided.
- Character spacing is 10 per inch with 132 print positions per line.
- Line spacing is six or eight lines per inch. Note: Print overlap may occur at eight lpi.
- May be attached up to 45m (150 ft).

Publications: "4973 Line Printer Description" (GA34-0044).

SPECIFY

Specify codes #9XXX may not be ordered independently.

- **Power Cord:** 1.8m (6 ft) cord. Specify #2744 for Canada and #2747 for Japan.
- **Machine Nomenclature:**

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		
- **Print Belt Character Set:** Orders must enter two numbers for the print belt, one from each of the following tables.

Character Belt Size:

48	#2767
64	#2768
96	#2799
(Japan only>	
128	#2873<)

Note: The 96-character belt contains two characters not used, resulting in a 94-character set. (Japan only>The 128-character belt is used only with Japanese Katakana (#2973).<)

Language	
EBCDIC	#2956
French	#2970
German	#2957
Italian	#2968

Forms Stand (#4450): Permits feeding of continuous forms from the carton and provides for forms stacking after printing. #4450 is recommended for handling of continuous forms for model 1 only (model 2 has a built-in forms stand).

Cables (#5700 (NO LONGER AVAILABLE), #5701 (NO LONGER AVAILABLE): Basic cable 6m (20 ft) long is included with the 4973 to connect it to its attachment feature. For longer cables between 9m (30 ft) and 45m (150 ft) obtained in 3m (10 ft) increments, order #5700 (NO LONGER AVAILABLE) in quantities between 1 and 13. Replacement cable to attach the 4973 to Series/1 may be purchased from IBM or from a customer-selected source. See "IBM Series/1 Customer Site Preparation Manual" (GA34-0050) for cable and connector details.

To order replacement cable by MES, use two feature codes. The first code, #5701 (NO LONGER AVAILABLE), provides connectors and 6m (20 ft) of cable. The second code, #5700 (NO LONGER AVAILABLE, is used to order 3m (10 ft) increments (minimum order of one). 6m (20 ft) replacement cable is not available by MES. Cables must be ordered by part number.

Print Belt, Additional: Permits customer to obtain more than one character set print belt for various applications. The belts are metal with engraved font, and can be used interchangeably with the one provided on the machine. Orders must enter two numbers for each additional print belt, one from each of the following tables.

Character Belt Size:

48	#2867
64	#2868
96	#2899
(Japan only>	
128	#2869<)

Note: Character belt contains two characters not used, resulting in a 94-character set. (Japan only>The 128-character belt is used only with Japanese Katakana(#2973).<)

Language	
EBCDIC	#2956
French	#2970
German	#2957
Italian	#2968
Japanese English	#2955
Japanese Katakana	#2973
Spanish	#2960
Spanish Speaking	#2969

SUPPLIES

Ribbons: A black ribbon, P/N 1136634 (No Longer Available) or equivalent, is required for model 1, and P/N 1136670 (No Longer Available) or equivalent is required for model 2. Contact IBM.

4974 PRINTERS

PURPOSE

The 4974 is a serial printer for Series/1.

MODELS

Model 1 001: (NO LONGER AVAILABLE)

Prerequisites: #5620 (NO LONGER AVAILABLE) or RPQ 8T1066 on a processor unit, 4959, or 4965. Customers are required to load the desired wire image table when using RPQ 8T1066.

HIGHLIGHTS

The 4974 is a 120 cps serial printer with a 64-character set and bidirectional printing. It prints 10 characters per inch and either six or eight lines per inch selectable under program control. It has vertical forms control. The 4974 is a table-top device, and may be attached up to 45m (150 ft).

The unit has a pressure feed platen that permits feeding of forms in a range of 3 to 15 inches overall width. Continuous forms fold-to-fold length may range from 3 to 14 inches. Edge-punched continuous forms are fed using the adjustable forms tractor, which is standard.

Matrix characters are formed by eight vertical wires printing dots in up to 4 of 7 possible horizontal positions. Refer to "Form-Design Printers Reference Guide" (GA24-3488) for forms design considerations and limitations. Up to 6-part forms can be printed with a maximum thickness of 4.6mm (0.018 in.). 5- and 6-part forms should be tried for satisfactory feeding, feeding, registrations, and print quality. Card stock continuous forms are not recommended. For optimum handling of continuous forms, the Forms Stand (#4450) is recommended.

Publications: "4974 Printer Description" (GA34-0025).

SPECIFY

Specify codes #9XXX may not be ordered independently.

- Voltage (AC, 1-phase):

50 Hz		60 Hz	
100V	#2804	100V	#2730
110V	#2805	115V	#9901
123.5V	#2811	200V	#2732
200V	#2806	208V	#9902
220V	#2813	230V	#9904
235V	#2814		

- Power Cord: 1.8m (6 ft) cord. Specify #2744 for Canada and #2747 for Japan.

- Machine Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Forms Stand (#4450): Permits feeding of continuous forms from the carton and provides for forms stacking after printing. It is recommended for optimum handling of continuous forms.

Cables: A basic 6m (20 ft) cable is included with the 4974 to connect it to its attachment feature. For longer cables between 9m (30 ft) and 45m (150 ft), obtained in 3m (10 foot) increments, order #5720 (NO LONGER AVAILABLE) in quantities between 1 and 13.

Replacement cable to attach the 4974 to Series/1 may be purchased from IBM or from a customer-selected source. See "IBM Series/1 Customer Site Preparation Manual" (GA34-0050) for cable and connector details.

To order replacement cable by MES, use two feature codes. The first code, #5721, provides connectors and 6m (20 ft) of cable. The second code, #5720 (NO LONGER AVAILABLE), is used to order 3m (10 ft) increments (minimum order of one). 6m (20 ft) replacement cable is not available by MES. Cables must be ordered by part number.

Tractor/Separator (RPQ D02078): Provides variable-width forms tractor with a mechanical cutter to separate single or multi-part perforated forms within 1.5 inches of the first print line. Field installation: No.

Tractor/Separator-FI (RPQ D02079): Provides a field installable version of RPQ D02078. Limitations: Available for field installation (MES) only.

SUPPLIES

Ribbons: A black ribbon, P/N 1136653 or equivalent, is required for machines shipped prior to February 6, 1981 or on machines not modified to accept the cartridge ribbon. A black cartridge ribbon, P/N 7034535 or equivalent, is required for all machines shipped on or after February 6, 1981 or on machines modified to accept the cartridge ribbon. Installed printers may be thus modified by ordering RPQ (Canada only > D09005.<) (Except Canada > D09007.<) This RPQ is "P" listed and may be ordered by MES. Contact IBM.

4975 PRINTER

(NO LONGER AVAILABLE)

PURPOSE

Serial Printer for Series/1.

MODELS

Model 01L: 80 cps*

Model 01R: 80 cps**

Model 02L: 160/40 cps*

Model 02R: 160/40 cps**

* Local to 1,219 meters (4,000 feet)

** Remote

Prerequisites: A Multifunction Attachment feature (#1310) with an appropriate attachment address (local or remote) available in a Processor or I/O Expansion Unit. For local attachment a Multifunction Attachment cable (#5770) or equivalent is required for each 4975.

Customer Setup (CSU): All mdls of the 4975 are designated as customer setup machines (CSU) thus offering the customer availability and relocation flexibility. Customer responsibilities are set forth in "Information Bulletin for Customer - Customer Setup" (G120-2743).

HIGHLIGHTS

The 4975 is a family of wire matrix table-top printers providing bidirectional printing at a maximum of 80 (mdl 01L and 01R) or 160 (mdl 02L and 02R) characters per second. All mdls of the 4975 printer have the following program-selectable functions:

- Vertical spacing of six or eight lines per inch.
- Horizontal print density of 10 or 15 characters per inch.
- Maximum line length of 13.2 inches.
- Character set selection:
 - Austria/Germany
 - Belgium
 - Brazil
 - Denmark/Norway
 - Finland/Sweden
 - France
 - French Canadian
 - Italy
 - Japan
 - Multinational
 - Portugal
 - Spain
 - Spanish Speaking
 - United Kingdom
 - US/Canada
- Incremental horizontal spacing commands, to 1/10 character increment.
- Incremental spacing at 1/96 inch.
- Multipart forms up to 4-part maximum.

All mdls of the 4975 include a cartridge ribbon and a variable-width forms tractor which provides a forms feeding device for continuous

marginally punched forms. A Rear Document Insertion Device (#6100) may be ordered for the 4975.

Two mdls of the 4975 (mdl 01L and 02L) provide for local attachment to the Series/1 using four-wire cabling at distances up to 1,219 meters (4,000 feet). Two other mdls of the 4975 (mdl 01R and 02R) provide for attachment to the Series/1 via leased line common carrier communication facilities. The Series/1 Multifunction Attachment feature (#1310) is used for both local and remote attachment of the 4975 to the Series/1.

The 4975 mdls 02L and 02R have a quality print capability in addition to the normal print capability. This quality print facility is provided through a quality print cartridge (provided with the printer). When operating in quality print mode the 4975 is limited to a maximum rate of 40 cps.

In quality print mode, the 4975 prints at half-normal speed and prints each line in two passes, resulting in high density, proportionally spaced printing at a rated speed of 40 cps. Quality printing is best suited to cut-forms and cut-form sets. Quality printing on continuous forms should be tested for satisfactory results.

Publications: IBM Series/1 4975 Printer and Multifunction Attachment Feature Description (GA34-0144).

SPECIFY

Specify codes #0XXX, may not be ordered independently. Apply to Plant Orders only, do not use on MES orders.

- Power (AC, 1-phase): With 2.4m (8 ft.) cord.

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	115V #9901
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803
	230V #9904

- Documentation Group: For language of the publications shipped with the machine, one of the following must be specified:

Canadian French #0777 Japanese #0783
English US #0758 Spanish #0760

Note: If a publication has not been translated into a national language, the English version will be provided.

- Character Set:

- #2750 Multinational character sets (15 program-selectable national character sets).
- (Japan only) > #2773 Japanese (Katakana - 129 characters) <

SPECIAL FEATURES

Special Printing Cartridge (#1601): Provides an operator-installable cartridge on installed mdls 02L and 02R only, which under program control, enhances printing capability. Expanded characters (2-, 4-, or 8-times single line height), bar codes (Code 39(R), MSI Plessey, UPC and EAN), and OCR-A printing can be produced in addition to quality print capability. The cartridge will produce a reasonable facsimile of bar codes and OCR-A printing as specified by national standards, industry standards and manufacturer's specifications for wand and scanning mechanisms. Code 39 bar code printed by the 4975 meets MIL-STD-1189. The 4975, prints a subset of OCR-A

for human-readable interpretation of Code 39 characters. See "IBM 4975 Printer Special Printing Cartridge Feature Description" (GA34-0250) for the OCR-A characters provided. Customers should test all bar code and OCR characters printed by the 4975 to ensure that their wand and scanning devices will adequately read the printed information. Bar code and OCR-A printing have been tested with commercially available wand mechanisms. See "IBM 4975 Printer Special Printing Cartridge Feature Description" (GA34-0250) for examples of OCR-A subsets provided. When printing bar code or expended characters, more ink will be used requiring more frequent ribbon changes. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: #1310 at or later than EC 466759 (see M4959 pages) and a CE Diskette Initializer at or later than EC 331653.

(R) Registered Trademark of Interface Mechanisms, Inc.

Special Printing Cartridge (#1610): Provides an operator-installable cartridge on plant orders of mdls 02L and 02R only, which under program control, enhances printing capability. Expanded characters (2-, 4-, or 8-times single line height), bar codes (Code 39, MSI Plessey, UPC and EAN) and OCR-A printing can be produced in addition to quality print capability. The cartridge will produce a reasonable facsimile of bar codes and OCR-A printing as specified by national standards, industry standards and manufacturer's specifications for wand and scanning mechanisms. Code 39 bar code printed by the 4975 meets MIL-STD-1189. The 4975, prints a subset of OCR-A for human-readable interpretation of Code 39 characters. See "IBM 4975 Printer Special Printing Cartridge Feature Description" (GA34-0250) for the OCR-A characters provided. Customers should test all bar code and OCR characters printed by the 4975 to ensure that their wand and scanning devices will adequately read the printed information. Bar code and OCR-A printing have been tested with commercially available wand mechanisms. See "IBM 4975 Printer Special Printing Cartridge Feature Description" (GA34-0250) for examples of OCR-A subsets provided. When printing bar code or expended characters, more ink will be used requiring more frequent ribbon changes. Maximum: One. Field Installation: No. Prerequisites: #1310 at or later than EC 466759 (see M4959 pages) and a CE Diskette Initializer at or later than EC 331653.

Rear Document Insertion Device (#6100): Provides the capability for manually inserting individual cut forms or cut forms sets. The forms tractor is removed by the operator and the Rear Document Insertion Device is installed. Adjustable guides permit forms from 14.6cm (5 3/4 in.) to 30.5cm (12 in.) wide to be used. Form length can be from 7.6cm (3 in.) to 35.6cm (14 in.). Up to 4-part forms may be used. Forms should always be tested to ensure customer acceptance. The leading edge (top edge) of form sets must be glued. Scribed lines on the forms guide assist in form alignment. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

MODEL CONVERSIONS

Model changes are not available.

ACCESSORIES

Cables: IBM shielded twisted-pair cable (or equivalent) is required for product attachment using the EIA RS-422-A/CCITT V.11 interface. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories. For proper identification, installation and application of cable and associated accessories, refer to "IBM Cabling System - Planning and Installation Guide" (GA27-3361). For pricing and ordering information, refer to the System Supplies operation within your country.

Forms Stand (#4450): A 1-shelf, floor-standing forms stand provides for stacking of continuous forms after printing. Field Installation: Yes.

SUPPLIES

Ribbons: A black ribbon in cartridge form; P/N 7034535 or equivalent (mdl 01L/R), or P/N 7032550 (mdl 02L/R). See your Country DP Supplies Coordinator.

4978 DISPLAY STATION

PURPOSE

The 4978 (RPQ D02055) is an advanced function display station for entering, editing, and displaying alphanumeric data. A movable keyboard permits the operator to manipulate data on the screen in a flexible and efficient manner.

MODELS

Model 1: 001 (NO LONGER AVAILABLE)

Prerequisites: RPQ D02038 on a processor unit, 4959, or 4965. Corequisite is RPQ D02055 along with the 4978.

HIGHLIGHTS

The 4978 is an interactive CRT display station capable of displaying 1,920 characters, 24 lines of 80 characters each. Multiple keyboard types and an extensive set of local functions are available. Display graphics and keybutton roles (i.e., data entry, local function, program function) are user-definable. The 4978 may be attached at up to 150m (500 ft).

Mdl 1 measures 533mm (21 in.) wide, 394mm (15.5 in.) high, and 394mm (15.5 in.) deep.

Publications: "IBM Series/1 4978 Display Station (RPQ D02055) and Attachment (RPQ D02038) General Information" (GA34-1550).

SPECIFY

Specify codes #9XXX may not be ordered independently.

- Power (AC, 1-phase):

	50 Hz		60 Hz
100V	#2804	100V	#2730
110V	#2805	115V	#9901
123.5V	#2811	200V	#2732
200V	#2806	208V	#9902
220V	#2813	230V	#9904
235V	#2814		

- Power Cord: 1.8m (6 ft) cord, Specify #2744 for Canada and #2747 for Japan.

SPECIAL FEATURES

(NO LONGER AVAILABLE)

Multiple keyboards are available to permit a variety of display station configurations. Key arrangements are fixed for a given keyboard. The role of each key may be user-modified through the use of user-accessible tables on the 4978 Display Station Attachment. Most keys identified as program function keys are fitted with a plastic cap to facilitate user-prepared and installed key identification. With the exception of RPQ D02064 (DAS/C keyboard), a 1m (3 ft) cable is provided, which allows approximately 0.7m (2.5 ft) of machine separation to allow attachment to the 4978 keyboard, maximum of one keyboard per 4978.

Extended Keyboard (RPQ D02056): A general purpose keyboard suitable for a wide variety of data entry and operator console applications. Contains a 122-key typewriter-like keyboard, including a 13-key control keypad, a 14-key numeric keypad, and 35 program function keys. Four cursor control keys (up, down, left, right) and the space key are typamatic. All other keys have momentary action.

All keys other than the fixed function keys may be typamatic by simultaneous depression of a repeat key. Field Installation: Yes.

Basic Keyboard (RPQ D02057): An 81-key typewriter-like keyboard, including a separate 11-key adding machine type numeric keypad. The space bar is typamatic. Other keys have momentary action. Suitable for a variety of data entry applications. Field Installation: Yes.

Audible Tone Alarm (RPQ D02060): An audible alarm to alert the operator to a special condition. The alarm may be sounded when a character is entered into a program-defined position on the screen, when an operator attempts to perform certain non-permissible operations, or under program control. Field Installation: Yes.

DAS/C Keyboard (RPQs D02064 and D02065): These keyboards are intended primarily for use in telephone directory assistance applications. Keytop legends are designed for this application. All keys are interrupt keys, irrespective of legend. Features include typewriter-like key arrangement, extended program function key capability, and replaceable legend keytops. RPQ D02064 provides a 2m (6 ft) cable and RPQ D02065 provides a 1m (3 ft) cable between the keyboard and the display station. The keyboards are identical in all other respects. Field Installation: Yes.

Video Monitor Attach (RPQ D02222): Permits attachment of an OEM video monitor to the 4978 for use in duplicating the display image being presented at the 4978. Field Installation: Yes.

Keyboard - Data Entry Large (RPQ D02275): Keyboard consists of 122 keys arranged in four groups. These groups are a typewriter-like arrangement of data entry keys, local function keypad, numeric data entry keypad, and interrupt request keys. Program function key capability and replaceable legend keys are provided. Keyboard is intended for use with the Intelligent Data Entry FDP (5798-NPY and 5798-NXQ). Field Installation: yes.

Keyboard - Data Entry Small (RPQ D02276): Keyboard consists of 82 keys featuring typewriter-like key arrangement, EBCDIC character set, uppercase and lowercase alphabets, 11-key numeric keypad, program function key capability, 13 replaceable legend keytops, expanded line and screen editing functions, and redefining key capability. Keyboard is intended for use with the Intelligent Data Entry FDP (5798-NPY and 5798-NXQ). Field Installation: Yes.

Keyboard - Text Entry and Edit (RPQ D02375): Intended for use with the Text Entry and Edit FDP (5798-RAR). Combination provides an input and editing device for authors, editors, and typographers. Keyboard consists of 122 keys featuring a typewriter layout, replaceable legend keybuttons, and special keys relating to FDP (5798-RAR). Field Installation: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES

Cables: The cables and/or associated parts to attach the 4978 to the Series/1 processor may be purchased from IBM or from a customer-selected source. The customer is responsible for laying, routing, maintenance, and availability of attachment cables for display installation by IBM. For IBM attachment cables, see RPQs D02032 and D02033 and below for delivery scheduling independent of machine type.

Cable Increments (RPQ D02032): (NO LONGER AVAILABLE) Provides 3m (10 ft) cable increments for extending the basic 6m (20 ft) 4978 attachment cable to a maximum length of 150m (500 ft). Must be ordered in quantity corresponding to desired length defined in the following table.

Total Cable Length Desired		No. of Cable Increments Required			
Meters	Feet		6	20	4412507
			9	30	4412551
			12	40	4412552
9	30	1	15	50	4412553
12	40	2	18	60	4412554
15	50	3	21	70	4412555
18	60	4	24	80	4412556
21	70	5	27	90	4412557
24	80	6	30	100	4412558
27	90	7	33	110	4412559
30	100	8	36	120	4413511
33	110	9	39	130	4413512
36	120	10	42	140	4413513
39	130	11	45	150	4413514
42	140	12	60	200	4413724
45	150	13	75	250	4413725
60	200	18	90	300	4413726
75	250	23	105	350	4413727
90	300	28	120	400	4413728
105	350	33	135	450	4413729
120	400	38	150	500	4413534
135	450	43			
150	500	48			
Keyboard Accessories: Keyboard access					

Cable Basic - 4978 Mdl 1 (RPQ D02033): Provides a basic 6m (20 ft) 4978 mdl 1 attachment cable. May be used with Cable Increments (RPQ D02032) to obtain a cable length up to a maximum of 150m (500 ft). Maximum: One.

4978 Attachment Cables: Attachment cables may be ordered as accessory bills of material for independent scheduling. Allow 60 days for delivery.

Keyboard Accessories: Keyboard accessories are available which allow the customer to change the inscriptions and messages on most of the keybuttons of the 4978 keyboards. These accessories consist of replaceable legend and blank keybuttons. Replaceable legend keybuttons consist of two parts, a molded base and a removable clear plastic cover. Blank keybuttons are available for customer engraving. Refer to the specific keyboard product description manual for a description of key sizes and positions. Order via Parts and Supply Requisition from Boca Raton. Contact IBM for ordering assistance.

Length	Mdl 1
Meters Feet	B/M Number

The following terms are used in the keybutton descriptions:

B	Blank keybutton available for customer engraving
RL-L	Large replaceable legend keybutton, stem slot on left
RL-R	Large replaceable legend keybutton, stem slot on right
RL	Small replaceable legend keybutton, stem slot in center

The following is a list of keybuttons available for keyboards D02056, D02275, and D02375:

Type	Size	Color	Part No.	Fits Key Positions
B	1x1	Light Gray	1853563	68-80, 82, 83, 85
B	1x1	Dark Gray	1853567	86, 87, 104, 105, 107, 108, 109
RL	1x1	White	5188775	125-130
RL	1x1	Dark Gray	8627192	146, 147, 149, 150, 151, 168
RL	1x1	Light Gray	8542831	169, 173
B	1x1	Light Gray	1853564	88-103
B	1x1	Dark Gray	1853568	88-103
B	1x1	Blue	1853451	88-103
B	1x1	Light Gray	1853565	111-123
B	1x1	Dark Gray	1853569	111-123
B	1x1	Light Gray	1853566	132-143
B	1x1	Dark Gray	1853570	132-143
RL-L	1x1-1/2	Dark Gray	5192813	1, 4, 7, 10, 13, 17, 20, 23, 26, 29, 32, 35, 39, 42, 61, 64, 81
RL-R	1x1-1/2	Dark Gray	5192815	3, 6, 9, 12, 15, 19, 22, 25, 28, 31, 34, 37, 41, 44, 63, 66, 67
B	1x2	Dark Gray	5192807	106
B	1x2	Light Gray	5192811	172
B	1x1-1/2	Dark Gray	5192801	124
B	1x1-1/2	Blue	1853452	110

The following is a list of keybuttons available for keyboards D02064 and D02065:

Type	Size	Color	Part No.	Fits Key Positions
B	1x1	Light Gray	1853563	68-80
B	1x1	Dark Gray	1853567	82-87
RL	1x1	White	5188775	104-109
RL	1x1	Dark Gray	8627192	125-130
RL	1x1	Light Gray	8542831	146-151, 170-173
B	1x1	Light Gray	1853564	88-103
B	1x1	Dark Gray	1853568	88-103
B	1x1	Blue	1853451	88-103
B	1x1	Light Gray	1853565	111-123
B	1x1	Dark Gray	1853569	111-123
B	1x1	Light Gray	1853566	132-144
B	1x1	Dark Gray	1853570	132-144
RL-L	1x1-1/2	Dark Gray	5192813	1, 4, 7, 10, 13, 17, 20, 23, 26, 29, 32, 35, 39, 42, 61, 64, 81
RL-R	1x1-1/2	Dark Gray	5192815	3, 6, 9, 12, 15, 19, 22, 25, 28, 31, 34, 37, 41, 44, 63, 66, 67
B	1x2	Light Gray	5192811	169
B	1x1-1/2	Dark Gray	5192801	124
B	1x1-1/2	Blue	1853452	110

The following is a list of keybuttons available for keyboards D02057 and D02276:

Type	Size	Color	Part No.	Fits Key Positions
B	1x1	Light Gray	1853563	39, 40, 41, 61, 62, 63
B	1x1	Dark Gray	1853567	71-80, 85
RL	1x1	White	5188775	104-106
RL	1x1	Dark Gray	8627192	125-127
RL	1x1	Light Gray	8542831	146-151, 170, 171
B	1x1	Blue	1853451	88-103
B	1x1	Light Gray	1853564	91-103
B	1x1	Dark Gray	1853568	91-103
B	1x1-1/2	Blue	1853445	113
B	1x1	Light Gray	1853565	114-123
B	1x1	Dark Gray	1852569	114-123
B	1x1	Light Gray	1853566	135-144
B	1x1	Dark Gray	1853570	135-144
RL-R	1x1-1/2	Dark Gray	5192815	26, 29, 32, 35, 38, 70
RL-L	1x1-1/2	Dark Gray	5192813	27, 30, 33, 36, 81
B	1x2	Light Gray	5192811	169
B	1x1-1/2	Dark Gray	5192801	124

Keybutton Extractor (P/N 9900373): The keybutton extractor is a small plier-like device which fits between rows of keybuttons. By squeezing on the handles, a firm grip is made on a keybutton and it may be pulled off its stem. The customer may find this helpful when replacing keybuttons or in doing any rearranging of the keyboard.

Labels (P/N 6842611): A die-cut 8-1/2 x 11 inch sheet containing 72 white self-stick blank labels for the 1x1-1/2 replaceable legend keybuttons and 48 self-stick blank labels for the 1x1 replaceable legend keybuttons.

Connectors: The listed connector kits and tools may be used with bulk 4978 attachment cable. Order via Parts and Supply Requisition from Boca Raton. Contact IBM for ordering assistance.

2x12 Berg Connector Kit	B/M 6841320
Berg Crimp Tool*	B/M 8327400
AMP 25-Pos. Connector Kit	B/M 6841321
AMP Crimp Tool	
and AMP Extractor Tool	B/M 8327404

* Use only with #24 AWG or #26 AWG wire (0.511mm or 0.40mm).

SUPPLIES (NONE)

4980 DISPLAY STATION

PURPOSE

The 4980 Display Station can be used with Series/1 for entering, editing and displaying alphanumeric data. A movable keyboard permits the operator to enter, display, and manipulate data on the screen in a highly flexible and efficient manner. This display station performs the same basic functions as the 4978 in a compact package with a low-profile keyboard and a tiltable display screen. Displays up to 1,920 characters with 24 lines of 80 characters each. The display station status, including cursor location (row/column), is shown on the 25th line.

MODELS

Model 1 001

Prerequisites: A Series/1 processor with #1250. A storage load is required for the 4980 and is provided by a diskette that is shipped with feature #1250, or may be ordered by P/N 6114487. The storage load is also provided by EDX V4.0.

Customer Setup (CSU): The 4980 is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine.

HIGHLIGHTS

The programmable character set includes 256 characters. The character set, definition of keyboard keys, function of the 24 command keys and the eight (seven in some countries) replaceable legend keys and additional microcode are down-loaded from the Series/1 at initialization. See "Type Catalog" for keyboard layout. Cable-Thru is a standard capability. A display screen glare-reduction treatment is provided. Displayed characters may be protected (displayed with normal intensity) or unprotected (displayed with high-intensity). The operator can reverse the image of the entire screen. Operator selection of a block or underscore cursor is also available. An adjustable audible alarm, is provided to alert the operator to special conditions. The low-profile keyboard has an adjustable slope. It has 127 total keys including 24 program-assigned command function keys to provide input and control flexibility.

Cabling: The cable attachment between the 4980(s) and/or Multidrop Workstation Attachment (#1250) must be made with twinaxial or shielded twisted-pair cable. Up to eight workstations may be installed up to 1,219 meters (4,000 feet) from Series/1 via the cable-thru capability of the 4980. A 6 meter (20 foot) Attachment Cable (#5780), is available on the Series/1 to attach the first 4980 to the Multidrop Workstation Attachment (#1250). Outdoor use of cabling is not supported.

Data transmission rates to the Series/1 can be up to 500K bps depending on twinaxial cable length. Transmission rates may be selected consistent with the following table.

Total Length of Twinaxial Cable/Port	Speed
Up to 244 meters (800 feet)	500K bps
Up to 488 meters (1,600 feet)	250K bps
Up to 1,219 meters (4,000 feet)	100K bps

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the *IBM 4980 Display Station Problem Determination Procedures* (GX21-9299). Also, see "Customer Responsibilities" below.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 4980.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM. Details of these conditions are described in the Customer Setup instructions.
- Relocation of the 4980, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 4980 prior to calling for IBM service.
- Providing a desk or table to support the 4980.
- Installation and maintenance of signal cables and associated parts for interconnecting the 4980s and the Multidrop Workstation Attachment (#1250).

- When adding additional display stations to Series/1, the customer may have to modify the system configuration specifications. See *IBM Series/1 Attachment Feature Storage Load User's Guide* (GA34-0133).

Publications: *IBM Series/1 Display Station Description and Reference Manual* (GX21-9296), *IBM 4980 Display Station Problem Determination Procedures* (GX21-9299), shipped with the product; *IBM 4980 Series/1 Display Station Setup Procedures* (GA21-9297), shipped with the product; *IBM 4980 Keyboard Template* (GX21-9298), one will be shipped with the product.

SPECIFY

Default Order Entry: Specify Codes may not be required when ordering a 4980. If other codes are not specified, appropriate defaults will be assumed based on the 3-digit country code. Default parameters are shown below.

- Voltage Defaults (AC, 50/60 Hz):

200-240V	100-127V
Argentina #0801	Canada #0802
Australia #0801	Colombia #0802
	Japan #0802
	Mexico #0802
	Venezuela #0802

Note: If the default voltage is not desired, or if a default is not listed for your country, specify #0802 for 100-127V, #0801 for 200-240V.

- Power Cord Default: The most commonly used plug for each country as shown in the *IBM Series/1 Site Preparation Manual* (GA34-0050), will be shipped with the machine.

For Canada and Japan, a standard non-locking plug will be supplied.

If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a 50 Hz power cord without a plug or #2746 for a 60 Hz power cord without a plug.

- Color: Pearl white only. No specify code required.
- Cables: See "Accessories" for 4980 mdl 1 twinaxial cable and associated components ordering instructions. For cable specifications, see the *IBM Series/1 Site Preparation Manual* (GA34-0050).
- Language Group Defaults: Includes nomenclature and keyboard graphics. See "Type Catalog" for keyboard nomenclature.

Argentina	Spanish Speaking	#2961
Australia	English US	#2956
Canada	English US	#2956
Colombia	Spanish Speaking	#2961
Japan	Japanese Katakana	#2973
Mexico	Spanish Speaking	#2961
Venezuela	Spanish Speaking	#2961

If exceptions to these language group defaults are desired, or if none is listed for your country, specify from the following list:

Canadian French	#2977
English US (EBCDIC)	#2956
Japanese English	#2955
Japanese Katakana	#2973
Spanish Speaking	#2961

SPECIAL FEATURES (None)

MODEL CONVERSIONS (None)

ACCESSORIES

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for product attachment. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-Pair Cable: For proper identification, installation and application of cable and associated accessories, refer to *IBM Cabling System - Planning and Installation Guide*, GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation and application of cable and associated accessories, refer to *IBM Series/1 Site*

4980 Display Station (cont'd)

Preparation Manual, GA34-0050. When cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Connector Kit: Includes two connectors. Twinaxial wire and one Twinaxial Connector Kit are required for each attachment cable. Individual connectors are available for replacement. Order as follows:

P/N 7362268 Connector Kit for vinyl-covered cables
P/N 7362229 Individual connector (replacement) for vinyl-covered cables

Twinaxial Wire: Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. Order as follows:

P/N 7362211 For vinyl-covered cable

Twinaxial Cable Assembly: Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly. Order as follows:

P/N 7362267 Cable assembly with vinyl-coated wire

Twinax Adapter (P/N 7362230): Permits two Twinax Cable Assemblies to be joined together.

Keytop Protective Cap: Clear plastic caps that cover replaceable-legend keytops to protect the label from normal wear. A full complement of keytop caps is provided with the machine. For replacement/spares order:

P/N 4585103 Keytop Cap (Qty: 1 each)

Keytop Label Sheets: Labels that provide the user with keytop blanks for labeling of replaceable legend keys. One sheet with 30 blank labels is provided with the machine. For replacement/spares order:

P/N 6019429 Labels, Blank (Qty: 1 sheet = 30 labels)

Storage Load Diskette: A storage load is required for the 4980 and is provided with a Multidrop Workstation Attachment (#1250), EDX V4.0 and Realtime Programming System 6.2 or higher. For those customers not utilizing one of the above listed sources, a 4980 storage load diskette may be ordered by P/N 6114487.

SUPPLIES (None)

4987 PROGRAMMABLE COMMUNICATION SUBSYSTEM

PURPOSE

The 4987 provides programmable communications multiplexing facility for Series/1.

MODELS

Model 1 001: Designed for mounting in a 4997 or EIA standard 19-inch rack enclosure. Full width unit.

Prerequisites: Programmable Communications Subsystem Controller (#1300) in a Processor Unit, 4959 or a 4965 Expansion Unit. A second controller is optional.

HIGHLIGHTS

The 4987 provides the ability to handle requirements of a wide variety of both standard and special terminals. It may be used in a wide range of applications involving large numbers of terminals and lines with speeds in the 45 to 9600 bits per second range. Asynchronous and synchronous terminals and system tapes can be connected to the same Series/1 system. The subsystem can be programmed to accommodate both standard and nonstandard line speeds, codes, line protocols, error checking, polling, and clocking.

The 4987 can accommodate up to 32 lines of point-to-point leased, point-to-point switched, or multipoint. In addition to programmability, the subsystem provides several communications features including auto-call, integrated modems, Data-Phone(R) digital service adapters, current interface, and modemless attachments. The 4987 includes a basic scanner. It attaches to Series/1 through one or two Programmable Communications Subsystem Controllers (#1300). The optional second controller (#1300) and associated Expansion Scanner (#3600) provide improved throughput for the 4987.

Publications: 4987 Programmable Communications Subsystem and 4990 Mdl 1 Communications Console Description (GA34-0049).

SPECIFY

Specify codes #8XXX and #9XXX apply to plant orders only; do not use on MES orders.

- Voltage (AC, 1-phase): One must be specified.

50 Hz		60 Hz	
100V	#2804	100V	#2730
110V	#2805	115V	#9901
123.5V	#2811	200V	#2732
200V	#2806	208V	#9902
220V	#2813	230V	#9904
235V	#2814		

- Power Cord: 1.8m (6 ft) cord is supplied as standard. (Canada only > Specify #2744. <) (Japan only > Specify #2747. <)
- Machine Nomenclature:

English US	#2950
French	#2928
German	#2929
Italian	#2932
Spanish	#2931

- Subsystem Number: For each 4987 included in a system, a functional sequence number must be specified. The number is the tens digit in the specify code #89X0. The first 4987 is designated #8910, the second #8920, etc.

SPECIAL FEATURES

All features except cables and the Expansion Scanner (#3600) require function specify codes. See "Attachment Feature Function Codes".

Note: #47XX features require two device addresses.

Expansion Scanner (#3600): The 16 feature locations in the 4987 can be divided into two 8-feature groups of up to 16 lines in each by adding one #3600. Field Installation: Yes. Prerequisites: A second Programmable Communications Subsystem Controller (#1300) in a Processor Unit, 4959 or a 4965 Expansion Unit.

Half-Duplex Attachment (#4730): For digital communications equipment. Provides for attachment of two independent switched or nonswitched, synchronous or asynchronous external data sets. If synchronous, it will use external clocking at speeds from 600 to 9600 bps. If asynchronous, it will use internal clocking at speeds from 45 to 1200 bps or 2400, 4800, or 9600 bps. Can accommodate two Data Set Attachment Cables (#2130) or customer-supplied equivalents. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

Full-Duplex Attachment (#4731): For digital communications equipment. Identical to #4730 except provides one full-duplex line instead of two half-duplex lines. Accommodates one Data Set Attachment Cable (#2130) or customer-supplied equivalent. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

TTY Current Attachment (#4734): Provides two DC current loop attachments for teletypewriters or equivalent devices. Supports 2- or 4-wire half-duplex operation. A programmable local copy option is also supported in 4-wire operation. Can accommodate two TTY Current Attachment Cables (#2131) and/or 3101 Current Loop Cable (#2066) or customer-supplied equivalents. Field Installation: Yes. SPECIFY: Function (see "Attachment Feature Function Codes").

Data-Phone(R) Adapter (#4736): (Effective February 1, 1984, NO LONGER AVAILABLE.) Provides Data-Phone Digital Service (DDS) attachment to a nonswitched network via a channel service unit at line speeds of 2400, 4800, and 9600 bps for non-SDLC synchronous disciplines. Can accommodate one DDS Attachment Cable (#2136) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalent. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

Asynchronous Local Attachment (#4739): Provides two interfaces for asynchronous transmission to systems or terminals without the use of modems. Operates at speeds from 45 to 1200 bps and 2400, 4800, and 9600 bps. Operates in half-duplex mode only. Can accommodate two Local Attachment Cables (#2132) or customer-supplied equivalents. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

Synchronous Local Attachment (#4740): Provides two interfaces for synchronous transmission to terminals and other systems without the use of modems. Operates in half-duplex mode only with speeds of 600, 1200, 2400, 4800, or 9600 bps. Can accommodate two Local Attachment Cables (#2132) or customer-supplied equivalents. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

(Canada only > Auto-Call Attachment (#4743): Provides, one half-duplex digital communications equipment attachment and one EIA RS-366 auto-call attachment. Operation of the half-duplex attachment is the same as the #4730 half-duplex attachment. Compatible with a Western Electric 801C or equivalent units. Can accommodate one Data Set Attachment Cable (#2130) and one Auto-Call Attachment Cable (#2133) or customer-supplied equivalent.

lents. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4746): (Effective February 1, 1984, NO LONGER AVAILABLE.) For asynchronous switched network. Provides a complete switched network modem; auto-answer function, auto-answer test, and wrap test. May be used as manual answer. Operates at speeds of 45 to 1200 bps. Can accommodate one Integrated Modem Switched Network Cable (#2134) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalent. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4747): (Effective February 1, 1984, NO LONGER AVAILABLE.) For asynchronous leased line with switched network backup. Provides a complete leased line modem with switched network backup auto-answer. Provides auto-answer function, auto-answer test, and wrap test. Operates at speeds of 45 to 1200 bps. Can accommodate one Integrated Modem Switched Network Cable (#2134) (Effective February 1, 1984, NO LONGER AVAILABLE) and one Integrated Modem Leased Line Cable (#2135) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalents. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4748): (Effective February 1, 1984, NO LONGER AVAILABLE.) For asynchronous leased line. Provides a complete leased line modem with wrap test. Operates at speeds of 45 to 1200 bps. Can accommodate one Integrated Modem Leased Line cable (#2135) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalent. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4749): For Asynchronous leased line. Provides a complete leased line modem with wrap test. Operates at speeds of 45 to 1200 bps. Can accommodate one Integrated Modem Leased Line Cable (#2137) or customer-supplied equivalent. (Japan only>For use on D1 Service.<) Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

(Canada only>1200 BPS Integrated Modem (#4751): (Effective February 1, 1984, NO LONGER AVAILABLE.) With clock for synchronous switched network. Provides a complete switched network modem for synchronous operation at 600 or 1200 bps (program-selectable). Provides auto-answer function, auto-answer test, and wrap test. Can accommodate one Integrated Modem Switched Network Cable (#2134) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalent. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4752): (Effective February 1, 1984, NO LONGER AVAILABLE.) With clock for synchronous leased line and switched network backup. Provides a complete leased line modem with switched network backup for synchronous operation at 600 or 1200 bps (program-selectable). Includes wrap test. Can accommodate one Integrated Modem Switched Network Cable (#2134) (Effective February 1, 1984, NO LONGER AVAILABLE) and one Integrated Modem Leased Line Cable (#2135) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalents. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4753): (NO LONGER AVAILABLE) With clock for synchronous leased line. Provides a complete leased line modem for synchronous operation at 600 or 1200 bps (program-selectable). Can accommodate one Integrated Modem Leased Line Cable (#2135) (Effective February 1, 1984, NO LONGER AVAILABLE) or customer-supplied equivalent. Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

1200 BPS Integrated Modem (#4754): With Clock for Synchronous leased line. Provides a complete leased line modem for synchronous operation at 600 or 1200 bps (program-selectable). Can accommodate one Integrated Modem Leased Line Cable (#2137) or customer-supplied equivalent. (Japan only>For use on D1 Ser-

vice.<) Field Installation: Yes. Specify: Function (see "Attachment Feature Function Codes").

Attachment Feature Function Codes: A unique function code must be specified for each attachment feature used on the 4987. Determine if the feature is attached to the basic scanner or to the Expansion Scanner (#3600). For each feature, determine specify code #8XXX from appropriate column and table.

Feature Number	Description	Basic Scanner	Expansion Scanner
#4730	Half-Duplex DCE Attachmt	#85XX See Table 1	#86XX See Table 1
#4731	Full-Duplex DCE Attachmt	#858X See Table 2	#868X See Table 2
#4734	TTY Current Attachmt	#853X See Table 3	#863X See Table 3
#4736	Data-Phone Digital Service Adapter	#854X See Table 4	#864X See Table 4
(Effective February 1, 1984, NO LONGER AVAILABLE.)			
#4739	Asynchronous Local Attachmt	#8550	#8650
#4740	Synchronous Local Attachmt	#8560	#8660
(Canada only>			
#4743	Auto-Call Attachment	#857X See Table 5	#867X See Table 5
#4746	1200 bps Integrated Modem for Asynchronous SN	#8590	#8690
(Effective February 1, 1984, NO LONGER AVAILABLE.)			
#4747	1200 bps Integrated Modem for Asynchronous LL-SNBU	#8591	#8691
(Effective February 1, 1984, NO LONGER AVAILABLE.)			
#4748	1200 bps Integrated Modem for Asynchronous LL	#8592	#8692
(Effective February 1, 1984, NO LONGER AVAILABLE.)			
#4749	1200 bps Integrated Modem for Asynchronous LL	#8593	#8693
(Effective February 1, 1984, NO LONGER AVAILABLE.)			
(Canada only>			
#4751	1200 bps Integrated Modem with Clock for Synchronous SN	#8594	#8694

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(Effective February 1, 1984,
NO LONGER AVAILABLE.)

Switched Line

1

Table 3: Suffix

#4752 1200 bps #8595 #8695
Integrated
Modem with Clock
for Synchronous LL-SNBU
(Effective February 1, 1984,
NO LONGER AVAILABLE.)

2nd Line Low
Speed Less
than 150 bps

2nd Line
High Speed
Gtr than
or Equal
to 150 bps

#4753 1200 bps #8596 #8696
Integrated
Modem with Clock
for Synchronous LL<)

1st Line
Low Speed
Less Than
150 bps

0

1

#4754 1200 bps #8597 #8697
Integrated
Modem with Clock
for Synchronous LL

1st Line High Speed
Greater
Than or
Equal
to 150 bps

2

3

Table 1: 2-Digit Suffix

2nd Line Leased Half- Duplex Network	2nd Line Leased Full- Duplex Network	2nd Line Switchd Half- Duplex Network	2nd Line Switchd Full- Duplex Network
1st Line Leased Half- Duplex Network	10	11	12
1st Line Leased Full- Duplex Network	14	15	16
1st Line Switched Half- Duplex Network	18	19	20
1st Line Switched Full- Duplex Network	22	23	24

Table 4: Suffix

2400 bps
4800 bps
9600 bps

Digit

0
1
2

Table 5: Suffix

	Half-Duplex Network	Full-Duplex Network
Leased Line	0	1
Switched Line	2	3

Compatible IBM Modems:

3863	Switched/Nonswitched
3864	Switched/Nonswitched
3865	Nonswitched
3868 mdl 1	Nonswitched
3868 mdl 2	Nonswitched
3868 mdl 3/4	Nonswitched
3872	Nonswitched
1200 bps Integrated Modems	

MODEL CONVERSIONS (None)

Table 2: Suffix

	Digit
Leased Line	0

ACCESSORIES

Cables:

Cable Code	Cable Description	Feature(s) Used With
#2066	3101 Current Loop Cable 15m (50 ft) cable attaching 3101 Display Terminal mdl 12 and 22.	#4734
#2100	Extension Cable 6m (20 ft) extension cable increment. For all synchronous or asynchronous attachments operating at speeds over 7200 bps only one extension	#4730, #4731, #4739, #4740, #4743

is allowed. All others allow nine extensions, for a total of 61m (200 ft).

- #2130 Data Set Attachment Cable #4730, #4731,
6m (20 ft) cable with modem #4743
interface (male EIA RS-232-C).
- #2131 TTY Current Attachment Cable #4734
6m (20 ft) 4-conductor cable
with ring terminals.
- #2132 Local Attachment Cable 6m #4739, #4740
(20 ft) cable with modem
interface.
(male EIA RS-366).
- #2133 Auto-Call Attachment Cable #4743
6m (20 ft) cable with modem
interface (male EIA RS-366).
- #2134 Integrated Modem Switched #4746, #4747,
Network Cable 6m (20 ft) #4751, #4752
9-conductor cable with
spade terminals.
(Effective February 1, 1984, NO LONGER AVAILABLE)
- #2135 Integrated Modem Leased Line #4747, #4748,
Cable 6m (20 ft) 4-conductor #4752, #4753
cable with Western Electric
Type 283 plug.
(Effective February 1, 1984, NO LONGER AVAILABLE)
- #2136 Data-Phone Digital Service #4736
Attachment Cable 6m (20 ft)
cable with modem interface
(male DDS Connector).
(Effective February 1, 1984, NO LONGER AVAILABLE)
- #2137 Integrated Modem Leased Line #4749, #4754
Cable 6m (20 ft) cable
4-conductor cable with spade
terminals.

(Japan only>

- #2946 Self Test Wrap Back Cable #4730, #4731,
1m (3 ft) cable with EIA #4743
connectors and a switching
mechanism which permits the
operator to run in normal or
test mode without disconnecting
cables.<)

Connectors: Associated parts to attach devices to the Programmable Communication Subsystem may be purchased from IBM or a customer-chosen source. The customer is responsible for installation and maintenance of the cables and their associated parts.

Connector	B/M No.	Cable No.
2 x 8 Berg Connector Kit	6327397	#2130, #2132, #2133, #2135, #2136, #2137
2 x 12 Berg Connector Kit	6327398	#2131
2 x 16 Berg Connector Kit	6060876	#2134

EIA Female Connector Kit	6060877	#2132
EIA Male Connector Kit	6060878	#2130, #2133
Integrated Modem Connector Kit	6060879	#2135
Digital Data Service Adapter Connector Kit	6060880	#2136

Tools: Berg Crimp Tool #22 AWG (HT 66-2266), B/M Number 6060698.

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SUPPLIES (None)

4993 CHANNEL TERMINATION ENCLOSURE
PURPOSE

The 4993 provides physical support, mechanical connection, and electrical termination for IBM S/370 channel interface cables. It is used in conjunction with the Series/1-IBM S/370 Channel Attachment (#1200) for connection to IBM S/370 (models 135-168), 3031, 3032, 3033, 4300.

MODELS
Model 1 001

Limitations: One 4993 per 4997 rack. On a 4997, this unit will be mounted at the bottom of the rack. It may not be installed with 4962 on 4997 mdl 1, or with two 4962s on 4997 mdl 2. Field installation may require Series/1 system reconfiguration.

Prerequisites: #1200 on a processor unit, 4959, or 4965.

HIGHLIGHTS

The 4993 is designed for mounting on a 4997 or an EIA standard 19-inch rack enclosure. It is a full-width unit 5.25 inches high.

The 4993 contains channel drive and receive terminators, power source, power on/off control, control unit enable/disable control, disable indicator lamp, and mechanical assembly. It provides capability for select-out bypass. The function occupies one control unit position on the S/370 channel interface, requiring 32 channel addresses. Up to eight Series/1s with 4993s may be connected to an S/370 system channel.

Publications: *System/370 Channel Attachment Feature and 4993 Termination Enclosure Description* (GA34-0057).

SPECIFY

Specify codes #9XXX may not be ordered independently.

- Voltage (AC, 1-phase):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	208V #9902
220V #2813	230V #9904
235V #2814	

- Power Cord: 1.8 meter (6 foot) cord. Specify #2744 for Canada and #2747 for Japan.

- Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		

SPECIAL FEATURES (None)
TERMS and CONDITIONS

Machine Group: B
Warranty: B
Per Call: 2

Educational Allowance: Yes
Pre-Installation Test Allowance:
None

MODEL CONVERSIONS (None)
ACCESSORIES

Cables: S/370 channel cables are not provided with the 4993. These cables (cable group 1806) should be identified and ordered when the S/370, 303X, or 43XX installation planning associated with the Series/1 is accomplished. See *IBM Series/1 Customer Site Preparation Manual* (GA34-0050) for details. Contact IBM for assistance.

SUPPLIES (None)

4994 ASCII DEVICE CONTROL UNIT

PURPOSE

Provides an ASCII Device Control Unit that can accommodate a variety of ASCII terminals including the 3101 model 1, 3161 or 3163.

MODELS A, B, C

Model A00: 16 RS-232-C Ports, 1 meter Rack

Model B00: 32 RS-232-C Ports, 1 meter Rack

Model C00: 48 RS-232-C Ports, 1 meter Rack

Limitations: The 4994 is not featurable.

Prerequisites: 4331, 4341, 4361, or 4381. S/370 Block Multiplexer Channel.

HIGHLIGHTS

The 4994 provides the ability to attach ASCII devices to host processors.

The display terminals that can be attached are defined in Terminal Definition Tables which are down-loaded from the host to the controller.

In order to be supported, the devices at a minimum must perform the following functions upon receipt of appropriate character sequences from the communication line:

- Clear-screen or clear to end-of-screen
- Absolute cursor positioning
- A character written to a screen position should replace (not over-strike) the previous character in that position.
- The communication interface for the 4994 is an asynchronous EIA RS-232-C/CCITT V.24. In addition each line has a jumper-selectable 20mA Current Loop connection. Data rates for asynchronous operation are program-selectable in two jumper-selectable ranges (37.5 to 1200 and 300 to 19,200 bps).

Programming Support: Program support for the 4994 is the Host Loaded Yale ASCII Communications System (5798-RRJ). This program offering provides a down-stream load capability for the 4994 control unit program. This program support runs under VM/SP Rel. 2.1 or 3.0 (5664-167) in the host.

Environmental Restriction: Certain atmospheric contaminants can destroy miniaturized electronic circuitry. These contaminants may be found in certain industrial and general urban environments. This machine should be protected from hostile, ambient conditions. See "IBM 4994 ASCII Device Control Unit General Information Manual" (GA34-0282), for details.

Publications: "IBM Series/1 Customer Site Preparation Manual" (GA34-0050), "IBM 4994 ASCII Device Control Unit General Information Manual" (GA34-0282).

SPECIFY

- Voltage (AC, 1-phase, 60 Hz): #2732 for 200V, #9902 for 208V, #2803 for 220 V, #9914 for 240V
- Power Cord: Standard power cord is 4.3m (14 ft), no specify required. Specify #9986 for special 1.8m (6 ft) cord when required by local jurisdiction. Specify #2744 for Canada, #2747 for Japan.

- Machine Nomenclature: English US only.

- Color Selection:

Willow Green	#9060
Garnet Rose	#9061
Sunrise Yellow	#9062
Classic Blue	#9063
Charcoal Brown	#9064
Pebble Gray	#9065

- Attachment of 3101: #2787, designates that a 3101 Display Terminal is on order for this system and that its delivery is to be synchronized with that of the system.

- Type of Distribution Channel: (Specify Only One)

#9001 Sales to Third Party Participants (TPPs): Sales to systems integrators, programming houses, other equipment manufacturers (OEMs), who, in turn, resell to end-users. Includes sales to business concerns who resell to their independent franchises or distributors.

#9002 End-User Sales: Sales directly to the business concern which will use the system for the intended application.

- Primary Application: (Specify only one)

- Industry Terminal Systems

#9010 Plant Floor System: Collection or dissemination of data using plant floor terminals requiring human intervention. Time and attendance, job reporting, etc.

#9011 Banking: System with banking terminal(s) attached.

#9012 Point of Sale: System with point of sale terminal(s) attached.

#9019 Other Industry Terminal System: Hospital systems or any other industry terminal systems.

- Industrial Automation

#9020 Electrical Test and Inspection: Monitoring or control of equipment that measures material or products to ensure conformance with specifications.

#9021 Process Control: Monitoring and control of production operations, primarily in the fluid and non-fluid process industries.

#9022 Laboratory Automation Systems: Includes instrument automation, experiment monitoring, and general laboratory automation.

#9023 Power Management - FC/PM: Power Management Systems which will use the Facilities Control/Power Management (FC/PM) licensed program.

#9024 Power Management - Non-FC/PM: Power Management Systems which will not use the FC/PM licensed program.

#9025 Facilities Management and Security: All other facilities management and security systems (except Controlled Access System (CAS)).

#9029 Other Industrial Automation: Controlled Access System (CAS), production monitoring, testing, and inspection (other than electronic test), discrete piece manufacturing, numeric control tape control, materials handling, environmental monitoring, maritime, railroad, auto traffic control, air traffic control, simulators.

Communications

#9030 Concentrators/Multiplexers: Consolidation of input from terminals for transmission over high-speed lines to a remote computer.

#9031 Front End Processors: For large systems.

#9032 Front End Processors: For small and medium sized systems.

#9033 Message Switching: Message routing and dispatching in a data communications network.

#9034 Telephone Switching: Switching (PABX Control), call routing, and central office switching.

#9035 Audio Store and Forward.

#9039 Other Communications Applications: All other communications applications.

- Scientific Computation

#9050 Problem Solving: Engineering/Scientific Calculations. May be timesharing.

#9051 Instructional: Stand-alone or timeshared systems for computer-assisted instruction and related functions.

- Business Data Processing

#9070 Remote Job Entry: RJE or Remote Batch Terminal.

#9071 Distributed Host Support - Data Entry: Single or clustered workstation terminal controller with limited peripherals and batch communication to a host. Primarily for dedicated intelligent data entry, but may be combined with Remote Job Entry/Batch functions.

#9072 Distributed Processing - Host-Dependent: Combinations of terminal control, file management, communications, peripheral control, data entry, and local processing with heavy dependency on a host processor for continuous operation.

#9073 Distributed Business Processing - Stand-Alone, Large Account: Stand-alone batch or interactive system for business applications in an enterprise with large systems. Offline communications to a host system is optional.

#9074 Business System - Small Account: Same as #9073 but in new accounts or in enterprises with small or medium-sized systems only.

#9075 Business Problem Solving: Series/1 installed for the primary purpose of providing non-DP professional business problem solving support.

#9076 Office Automation: Series/1 installed primarily for text processing, electronic mail, audio distribution, etc., with or without some commercial applications.

#9079 Other Business Applications: All other business data processing applications.

- Other Applications

#9090 Applications not classified in any category above: For example, graphic arts (typesetting, etc.), design and drafting, undefined government, and any other.

- Application Unknown

#9096 Applications temporarily unknown: Specify within 15 days of order entry.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Connectors/Tools: For information on connectors and tools --- see "Accessories" in M4959 pages.

Device Attachment Cable (#2056): Asynchronous local attachment cable.

EIA Data Set Cable (#2057): EIA data set attachment.

S/370 Channel Cables: Not provided with the 4994. These cables (Cable Group 1806) should be identified and ordered through Customer Engineering and the marketing divisions when the 4331, 4341, 4361, or 4381 planning associated with the 4994 is accomplished. See "IBM Series/1 Customer Site Preparation Manual" (GA34-0050) for details.

SUPPLIES (NONE)



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4997 RACK ENCLOSURE

PURPOSE

The 4997 is a rack mounting enclosure for Series/1 units.

MODELS

Model 1A	01A	1 meter (39.4 inches), plain covers
Model 1B	01B	1 meter (39.4 inches), decorative covers
Model 2A	02A	1.8 meters (70.1 inches), plain covers
Model 2B	02B	1.8 meters (70.1 inches), decorative covers

Limitations: 1 meter (39.4 inch) and 1.8 meter (70.1 inch) racks may not be mixed on a single system.

Prerequisites: Half-width units require the Rack Mounting Fixture (#4540). Two half-width units can fit into one fixture.

HIGHLIGHTS

The 4997 provides an EIA standard 19-inch rack type enclosure for mounting of Series/1 units. See *Customer Site Preparation Manual* (GA34-0050) for details. Mdl 1A allows for mounting of two full-width units. Dimensions are approximately 1 meter (39.4 inches) high, 750mm (29.5 inches) deep, and 610mm (24 inches) wide. All unused openings are covered with plain black aluminum covers. Mdl 1B is similar to 1A, but includes decorative covers over all unused spaces and is more suitable for areas of public display. Mdl 2A is supplied with three sets of support rails (fixed) but space is available for mounting four full-width units. Supplemental units to be mounted within the 4997 will require additional support rails. All unused openings are covered with plain black aluminum covers. Mdl 2B is similar to 2A, but also includes decorative covers over all unused spaces. Dimensions are approximately 1.8 meters (70.1 inches) high, 750mm (29.5 inches) deep, and 610mm (24 inches) wide. All mdls include primary power receptacle panel and instantaneous power off switch.

SPECIFY

Specify codes #9XXX may not be ordered independently.

- Voltage (AC, 1-phase):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	208V #9902
220V #2813	230V #9904
235V #2814	

Note: The rack enclosure line cord is limited to 16 amperes. For detail power requirement, see *Customer Site Preparation Manual* (GA34-0050). In general, 115V AC 1-phase power will be limited to small systems such as mount on a 4997 mdl 1A or 1B.

- Power Cord: Standard power cord is 4.3 meters (14 feet), no specify required. Obtain special 1.8 meter (6 foot) cord when required by local jurisdiction, specify #9986. Specify #2744 for Canada and #2747 for Japan.
- Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		
- Rack Sequence: Specify #9197 for first rack, #9198 for subsequent rack. Unit location on 4997 is determined by IBM. For details, see *IBM Series/1 System Selection Guide* (GA34-0143). For special system configurations, submit RPQ. Relocation after delivery is billable CE service under Series/1 relocation plan.

SPECIAL FEATURES (None)

TERMS and CONDITIONS

Machine Group: B
Warranty: B
Per Call: 2

Educational Allowance: Yes
Pre-Installation Test Allowance:
None

MODEL CONVERSIONS (None)

ACCESSORIES

Covers:

Plain 3.5 inch	B/M 6841313
Plain 5.25 inch	B/M 6841315
Plain 14 inch	B/M 6841314
Decorative 3.5 inch	B/M 6841318
Decorative 5.25 inch	B/M 6841316
Decorative 14 inch	B/M 6841317

Support Rails (Fixed):

Mdl 1	B/M 6841311
Mdl 2	B/M 6841312

Contact IBM for assistance in ordering accessories.

SUPPLIES (None)

4999 BATTERY BACKUP UNIT
PURPOSE

The 4999 provides battery backup for processor units in conjunction with user-supplied batteries and charger.

MODELS

- Model 1 001** For processors operating on 100 to 123.5V AC, 50/60 Hz
- Model 2 002** For processors operating on 200 to 235V AC, 50/60 Hz

Limitations: May not be used with 4952 mdl C, 4954 mdl C, 4956 mdl C, or 4965. For 4952 mdl B, 4954 mdl B, 4955 mdls E and F, and 4956 mdl B, maximum configuration support is 800 VA (corrected for power factor). Contact IBM for further information. May not be used with 4952 mdl A prior to serial number 50000 (EC 375810).

Prerequisites: Space in Rack Mounting Fixture (**#4540**). See "Accessories" in the M4959 pages. #1565 is required for 4955 with 4959 attached.

HIGHLIGHTS

The 4999 is a half-width unit designed for mounting on a 4997 or an EIA standard 19-inch rack enclosure using the Rack Mounting Fixture (**#4540**). It provides capability for battery takeover in case of power failure. Duration of battery support depends on processor loading and customer-supplied battery characteristics. The 4999 does not include battery or battery charger.

Publications: 4999 Battery Backup Unit Description (GA34-0032).

SPECIFY

- Power Cord: Specify **#2744** for Canada and **#2747** for Japan.
- Nomenclature:

English US	#2750	Italian	#2932
French	#2928	Spanish	#2931
German	#2929		

SPECIAL FEATURES (None)
TERMS and CONDITIONS

Machine Group: B	Educational Allowance: Yes
Warranty: B	Pre-Installation Test Allowance:
Per Call: 2	None

MODEL CONVERSIONS (None)
ACCESSORIES (None)
SUPPLIES (None)

5081 DISPLAY

PURPOSE

A raster display, available in a color or monochrome model, for the 5080 Graphics System or the RT Personal Computer. The user interacts with the display via an alphanumeric, graphics, or APL keyboard, a 5083 tablet, a lighted program function keyboard, and/or a Dials feature when these are connected to a 5085 Graphics Processor. On the RT Personal Computer, interaction with the display is also possible by means of the RT Personal Computer Mouse.

MODELS

Model 011: Monochrome Display

Model 012: Color Display (NO LONGER AVAILABLE)

Model 016: Color Display

Model 019: Color Display

Prerequisites: 5081 Models 11, 16 and 19 require a 60 Hz non-interlaced 5085 or other 60 Hz non-interlaced driver as prerequisites for these displays.

HIGHLIGHTS

- A steady, bright image with a 60 Hz non-interlaced refresh rate.
- A sharp image on both the color and monochrome models because of the small pixel (spot) sizes they generate.
- Up to 256 simultaneously-displayable gray shades (model 011) or colors (model 016 and 019) selected from a range of 4,096 (if attached to the 5085 model 1A or RT PC with the MegaPel Adapter) or 32,768 (if attached to the 5085 mdl 2).
- User controls for coarse convergence adjustment, picture centering, contrast (model 011 only) and brightness as well as four indicators for fault isolation are located at the bottom of the front of the display behind a flip-down cover.
- An anti-reflective treatment in both the color and the monochrome display screens for clear, comfortable operator viewing.
- Self-Convergence (model 16 only)
- Enhanced contrast (models 16 and 19) through the use of special filter additives to the glass on the display.
- A 19-inch (diagonal) screen (models 11, 12 and 19) with a 1,024 x 1,024 pixel array displayed on an area 284mm (11.2 in.) by 284mm (11.2 in.).
- A 16-inch (diagonal) screen (model 16) with a 1,024 x 1,024 pixel array displayed on an area 236mm (9.3 in.) by 236mm (9.3 in.).
- Compact dimensions - 490mm (19.29 in.) high, 490mm (19.29 in.) wide, and 553mm (21.77 in.) deep for model 11 and 490mm (19.29 in.) high, 475mm (18.75 in.) wide and 540mm (21.25 in.) deep for model 19.
- Smaller compact dimensions for the model 16 - 416mm (16.38 in.) high, 406mm (16.0 in.) wide and 451mm (17.57 in.) deep.
- A convenient tilt-and-swivel mechanism for user selection of viewing positions.
- Each 5081 provides an RS-343 attachment for the cable connection of an additional 5081; either model can be

daisy-chained from the other by using the RS-343 also. An IBM 5082 Projection System may be attached to the 5081 Models 12, 16 and 19. All 5081s connected in this fashion display the same picture.

Peripherals: The 5085 Processor controls the following peripherals which can be attached via a connection box stored in the tilt-swivel base of the 5081 Display:

- 5083 Tablet (see M5083 pages)
- Dials (see M5085 pages)
- Alphanumeric Keyboard (see M5085 pages)
- Graphics Keyboard (see M5085 pages)
- (Japan only > Katakana Keyboard (see M5085 pages) <)
- Lighted Program Function Keyboard (see M5085 pages)

Physical Specifications

Model 011

Width - 490mm (19.29 in.)
Depth - 553mm (21.77 in.)
Height - 490mm (19.29 in.)
Weight - 39.0Kgs (86.0 lbs.)

Model 016

Width - 406mm (16.0 in.)
Depth - 451mm (17.57 in.)
Height - 416mm (16.38 in.)
Weight - 31Kgs (68.2 lbs.)

Model 019

Width - 475mm (18.75 in.)
Depth - 540mm (21.25 in.)
Height - 490mm (19.29 in.)
Weight - 42.0Kgs (91.0 lbs.)

Customer Responsibilities: The customer is responsible for:

1. Physical planning and site preparation.
2. Provision of the required electrical service and facilities. See "5080 Graphics System Site Planning and Preparation Guide" (GA23-0129), or the "IBM RT Personal Computer Site Planning and Preparation Guide" (GA23-1058), for details on these responsibilities.
3. (Except Japan > Setup and installation of the 5081. <)
4. (Japan only > CE has setup responsibility. <)
5. Training of 5081 operators.

Maintenance: The 5081 is offered with Customer Engineering on-site service under an MMMC.

Cables: Cables from the 5085 to the 5081 (three video coaxial cables and the signal cable with a special connector for the attachment of peripheral devices) are supplied with the 5085.

Cables for the peripheral devices controlled by the 5085, but physically attached to the front of the 5081 Display, are supplied with each device. See GA23-0129 for descriptions.

Video cables connecting the 5081 to the MegaPel Display Adapter are supplied with the MegaPel Adapter.

The attachment of additional (output only) color displays to the first 5081 models 16 or 19 requires a customer-supplied video coaxial cable made up of a combination of three cables (RG-59/U type). The attachment of additional (output-only) mono displays to the first 5081 model 11 requires a customer-supplied single video coaxial cable (RG-59/U type). See GA23-0129 for further descriptions.

MACHINES

SPECIFY

- Power (AC, 1-phase):

50 Hz	60 Hz
100V #2807	100V #2807
220V/240V #2081	120V #9901

- For an additional 5081 attached to a 5085, or for additional 5081s attached to 5081s, or 5081 attached to a unit other than a 5085 (a line cord from the 5081 to the wall will be supplied), specify #2001.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

Screen Cleaner: Thin Film Cleaner for Optical Components, P/N 7034436.

5082 COLOR PROJECTION SYSTEM

PURPOSE

A high definition color projection capability for the 5080 Graphics System is provided by the 5082 Model 001 and its optional accessories. The projector has three lenses with 7.7 inch liquid cooled CRTs. Internal diagnostics are provided for user problem determination and FRU isolation by the National Service Division. The projector is a customer set-up unit and includes a wired remote controller that allows user operation and adjustment of the 5082 Model 001.

MODELS

Model 001: Projector with Remote Controller.

Model S01: Consisting of the 5082-001 Projector, the 5082 Projector Cart, the 5082 High Grain Curved Screen, and the 5082 Screen Stand.

Model S02: Consisting of the 5082-001 Projector, the 5082 Projector Cart, and the 5082 High Grain Curved Screen.

Model S03: Consisting of the 5082-001 Projector and the 5082 Projector Cart.

Model S04: Consisting of the 5082-001 Projector and the 5082 High Grain Curved Screen.

Limitations: The 5082 model 001 will not function properly when attached to a 50Hz non-interlaced 5085 or 5081.

Prerequisites: The 5082 model 001 must be connected to a 60Hz non-interlaced 5085 or 5081 or equivalent device.

Customer Setup (CSU): 5082 is customer setup and adjustable when mounted in the Cart or Table top front screen position.

HIGHLIGHTS

- Connects directly to the 60Hz non-interlaced 5085 Graphics Processor or the 60Hz non-interlaced 5081 Color Display via the RGB interface.
- A sharp color image (1024 X 1024 or 1280(H) X 1024(V)) is provided with a small pixel (spot) size. The optional High Gain Screen offers a bright 100-inch (diagonal) display on an area 152.4cm (60.0 in.) by 152.4cm (60.0 in.) for 5080 graphics.
- User control of all adjustments and projector controls through the use of a wired remote controller with 32 character back lighted LCD. Registration and display adjustments are digitally controlled to facilitate accurate and stable customer set-up, adjustment and ease of use.
- 60Hz non-interlaced frame rate.
- Internal test patterns and diagnostics for user set-up, problem determination and FRU isolation by Field Engineering.
- With optional screen stand, a convenient three position tilt-height mechanism for user selection of viewing positions.
- Can connect directly to the 60Hz non-interlaced IBM 5085 Graphics Processor or the 60Hz non-interlaced IBM 5081 Color Displays via the R-G-B connector.

DESCRIPTION

The 5082 Model 001 Projector is an advanced color display projector designed for the technical professional. The 5082 enables Engi-

neers, Scientist, Designers and professionals to view the output of graphic applications on a 100 inch diagonal screen.

The 60Hz non-interlaced (NI) refresh rate, in combination with the three lenses, liquid cooled CRTs, offer the user a sharp, bright high definition image for extended group viewing.

A unique Feature of the 5082 is the wired hand held remote controller which allows customer control of 5082 operations and all adjustments. The remote controller is attached to the 5082 by a 20 foot cable which allows the customer to make precision adjustments while standing close to the screen. The remote controller has a 32 character LCD that provides operational, diagnostic and set-up adjustment data to the customer.

Standard Features:

- Wired Hand Held Microprocessor Remote Controller with 16 Illuminated Control Push Buttons for Customer Set-Up and Adjustment.
- Brightness, Contrast and Power On/Off Customer controls
- Internal Diagnostic Microcode
- Microprocessor controlled Digital Registration
- Selectable Aspect Ratios (4)
- External Composite Sync and H & V Drive Inputs
- Buffer Isolated Video Outputs (R-G-B)
- 172mm F1.0 Lenses
- Large 7.7 inch Liquid Cooled CRTs.

Physical Specifications: 5082 Model 001 Projector

Width - 780mm (30.70 in.)
Depth - 980mm (38.58 in.)
Height - 360mm (14.17 in.)
Weight - 90kg (198.4 lbs.)

5082 Projector Cart

Width - 760mm (30.0 in.)
Depth - 974mm (38.3 in.)
Height - 457mm (18.0 in.)
Weight - 73kg (160.0 lbs.)

5082 High Gain Curved Screen

Width - 2080mm (82.0 in.)
Depth - 230mm (9.0 in.)
Height - 1570mm (62.0 in.)
Weight - 28kg (63.0 lbs.)

5082 HGC Screen Stand

Width - 1620mm (63.8 in.)
Depth - 900mm (35.5 in.)
Height - 2210mm (87.0 in.)***

*** This dimension is the height of the Screen Stand with the screen mounting bracket attached at the highest position.

Operating Environment:

Temperature - 15.6 to 32.2 degrees C (60 to 90 degrees F)
Relative Humidity - 8 to 80 percent non-condensing

Customer Responsibilities: The customer is responsible for physical planning, site preparation, including the required electrical services and facilities, setup and installation.

Publications:

- "5082 Setup and Operations" (GA23-2017)
- "5082 Problem Determination" (GA23-2023)

MACHINES

- "5082 Site Planning" (GA23-2016)
- "5082 Maintenance Information" (SY66-0109)

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Projector Cart (P/N 6247683): A custom stand for the 5082 model 001 with compatible casters, leveling pads and room for accessory storage.

Projector Screen (P/N 6247690): A 100 inch diagonal high gain curved screen with a wall mounting bracket that provides three pre-set tilt positions.

Screen Stand (P/N 6247686): A freestanding support for the high gain curved screen with four pre-set height positions.

| **Rear Projection Mount (#5004):** A no-charge feature that provides for IBM adjustment to the 5082-001 Projector which allows proper image projection when the 5082-001 is mounted behind the screen.

| **Ceiling Mount (#5005):** A no-charge feature that provides for IBM adjustment to the 5082-001 Projector which allows proper image projection when the 5082-001 is mounted in the ceiling.

SUPPLIES (NONE)

5083 TABLET MDLS 001, 012, 12A

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

PURPOSE

The Tablet is a thin flat-surfaced unit of compact design, which offers a comfortable, easy-to-use way for users to interact with, for example, the 5080 Graphics System's 5081 Display and 5085 Graphics Processor, and the RT PC. It has a palm rest and tilt-height adjustments so it can be used either on a desk or a user's lap. The X,Y coordinate position of the cursor or stylus is transmitted, for example, to the 5085 Graphics Processor or the RT PC Processor when, and whenever, these units are moved on the tablet's active surface.

MODELS 001, 012, 12A

Model 1 001: (NO LONGER AVAILABLE) Has dimensions of 400mm (15.75 in.) wide, 431.5mm (17 in.) long, and 21mm (0.82 in.) deep which includes an active area of 292mm (11.5 in.) by 292mm (11.5 in.). Weighs 2.9kg (6.5 pounds). Has a thin cable connection to the Peripheral Control Assembly in the base of the 5081 Display.

Model 12 012: (NO LONGER AVAILABLE) Has dimensions of 362.7mm (14.28 in.) wide, 417.6mm (16.44 in.) long, a front depth of 17.1mm (0.67 in.), and a rear depth of 29.7mm (1.17 in.). The active area is 292.1mm X 292.1mm (11.5 in. X 11.5 in.). Weight is 2.73Kg (6.0 lbs.). Has a thin cable connection to the peripheral control assembly in the base of the 5081 Display. Connection to the RT PC is via a 5083 Tablet Cable Kit (#7586, P/N 6487586), a feature on the RT PC (ordered through RT PC ordering procedures).

Model 12A: Has dimensions of 362.7mm (14.28 in.) wide, 417.6mm (16.44 in.) long, a front depth of 17.1mm (0.67 in.), and a rear depth of 29.7mm (1.17 in.). The active area is 292.1mm X 292.1mm (11.5 in. X 11.5 in.). Weight is 2.73Kg (6.0 lbs.). Has a thin cable connection to the peripheral control assembly in the base of the 5081 Display. Connection to the RT PC is via a 5083 Tablet Cable Kit (#7586, P/N 6487586), a feature on the RT PC (ordered through RT PC ordering procedures).

Limitations: The #6351 stylus and #1511 cursor cannot be used concurrently.

All attachment features (#3776, #4010, #4020 and #4025) cannot be used concurrently.

Features #3776 and #4010 cannot be used concurrently with power supply features #4050, #0805 or #2730.

Highlights for Models 001 and 012

- Has a resolution characteristic of 0.127mm (0.005 in.) on Mdl 001; 0.0508mm (0.002 in.) on Mdl 012.
- The 4-Button Cursor feature provides users with a convenient hand-held "mouse-shaped" unit which has four buttons for application use and a fine cross-hair for precise alignment and accurate digitizing of source data.
- The stylus feature provides a pen-like device for user interaction with the 5080 system or an RT PC. An indication is provided to the application program when the user activates the stylus tip switch by pressing the stylus tip to the tablet surface. The tactile feedback from pressing the stylus tip assures the user that a selection has been made.
- Can be used for 3250 light-pen emulation using either the stylus or cursor feature.

Highlights for Model 12A

- 5083 model 12A offers a new tablet design, providing a 15 pin "D" style connector plug for attachment of system adapter cables.
- Separate adapter cables and plug combinations provide for attachment to the 5080, RT PC, and the PC, PC XT and PC AT.
- Three new power supply features provide DC power for attachment of tablets to the PC, PC XT and PC AT.
- 5083 tablet model 12A is compatible with 5083 model 12 when attached to a 5080 or RT PC. The model 12A offers the same high resolution of 500 lines per inch, compact dimensions with an improved appearance, a strong snap-on tilt stand and palm rest to enable the user to work at an angle of 9 degrees, positive screw lock connectors for the attachment of a stylus or cursor, and built in testing capabilities.
- The same special features include a stylus and 4-button cursor. Drawings placed atop the tablet surface may be digitized. Menus may also be placed on top of the tablet and selected. The fine cross-hair in the cursor feature facilitates accurate positioning. Four buttons can be used to transmit additional information to the graphics application program. A stylus can be used for interaction with the displayed image through stylus pen contact with the surface tablet.
- Model 12A (like the model 12) is a light weight unit, with a flexible cable, that can easily be moved about the work space or can be used in the user's lap.

Customer Responsibilities: (Except Japan>The customer is responsible for setup and installation of the 5083 and training of the 5083 user.<) (Japan only>Customer Engineering has setup responsibility for all units in the 5080 Graphics System. The customer is responsible for training the 5083 user.<)

Customer Problem Analysis and Resolution (CPAR): The 5083 is offered with Customer Engineering service under an MMMC.

SPECIFY (NONE)

SPECIAL FEATURES

4-Button Cursor (#1511): For user interaction with the displayed image through 4-Button Cursor location on the surface of the Tablet. Can also be used to emulate 3250 Light-Pen operation. Can be used for conveniently digitizing drawings placed on top of the Tablet surface. The cross-hair facilitates accurate positioning. Four buttons can be used to transmit additional information to the graphics application programs. Has cable to connect to the 5083 Tablet. Maximum: One. Field Installation: Yes. Limitations: Cannot be used concurrently with Stylus Feature (#6351).

Stylus (#6351): For user interaction with the displayed image through stylus pen contact with the surface of the Tablet. Can also be used to emulate 3250 Light-Pen operation. Has cable to connect to the 5083. Maximum: One. Field Installation: Yes. Limitations: Cannot be used concurrently with Cursor Feature (#1511).

The following features are also available for the Model 12A:

- Cable kit for tablet attachment to 5080 (#3776)
- Cable kit for tablet attachment to 6150 and 6151 RT PC (#4010)*
- Cable kit for tablet attachment to 5150 PC/5160 PC XT (#4020)
- Cable kit for tablet attachment to 5170 PC AT (#4025)
- 120V/60 Hz power supply for PC/PC XT/PC AT (#4050)
- 240V/50 Hz power supply for PC/PC XT/PC AT (#0805)
- 100V/60 Hz/50 Hz power supply for PC/PC XT/ PC AT (#2730) (PC, PC XT and PC AT require a power supply)

| * The 5083 tablet cable kit (#7586), available as a feature on the RT
| Personal Computer, is not required for the 5083 model 12A tablet
| attachment to the RT Personal Computer when 5083 feature code
| #4010 is ordered. A diagnostic diskette is included with the 5083
| tablet.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5083 TABLET MODEL 2**PURPOSE**

The Tablet is a thin flat-surfaced unit of compact design for use with the IBM 3270-PC/G, 3270-PC/GX, 3270-PC AT/G, 3270-PC AT/GX workstations and IBM 5170 with a 3270-PC AT/G or 3270-PC AT/GX Option Kit installed to the list of workstations with which this tablet may be used.

MODEL 2

Model 2 002: Has dimensions of 400mm (15.75 in.) wide, 431.5mm (17 in.) long, and 21.0mm (0.82 in.) deep which includes an active area of 292mm (11.5 in.) by 292mm (11.5 in.). Weighs 2.9kg (6.5 pounds). Has a thin cable with plug which attaches to the 5371 System Unit mdls 12, 14, or 16, 5373 System Unit and 5170 System Unit.

HIGHLIGHTS

- Has a resolution characteristic of 0.127mm (0.005 in.).
- The cursor feature provides users with a convenient hand-held "mouse-shaped" unit which has four buttons for application use and a fine cross-hair for precise alignment and accurate digitizing of source data.
- The stylus feature provides a pen-like device for user interaction. The tactile feedback from pressing the stylus tip assures the user that a selection has been made.

Customer Responsibilities: The customer is responsible for setup and installation of the 5083 mdl 2 and training of the 5083 user.

SPECIFY (NONE)**SPECIAL FEATURES**

Cursor (#1511, P/N 6248428): For user interaction with the displayed image through cursor location on the surface of the Tablet. Can be used for conveniently digitizing drawings placed on top of the Tablet surface. The cross-hair facilitates accurate positioning. Four buttons can be used to transmit additional information to the graphics application programs. Has cable to connect to the 5083 Tablet. Maximum: One. Field Installation: Yes. Limitations: A #1511 cursor or #6351 stylus is required to operate the tablet, but only one of these may be connected at any one time. Cannot be used concurrently with Stylus Feature (#6351).

Stylus (#6351, P/N 6248427): For user interaction with the displayed image through stylus pen contact with the surface of the Tablet. Has cable to connect to the 5083. Maximum: One. Field Installation: Yes. Limitations: A #1511 cursor or #6351 stylus is required to operate the tablet, but only one of these may be connected at any one time. Cannot be used concurrently with Cursor feature (#1511).

MODEL CONVERSIONS (NONE)**ACCESSORIES (NONE)****SUPPLIES (NONE)**

5083 TABLET MDL 11, 11A

PURPOSE

The (CursorPad TM) is a thin flat-surfaced tablet of compact design, which offers a comfortable, easy-to-use way for users to interact with the 5080 Graphics System's 5081 Display and 5085 Graphics Processor. It has a palm rest and snap on height adjustment so it can be used either on a desk or a user's lap. The X, Y coordinate position of the cursor or stylus is transmitted to the 5085 Graphics Processor when, and whenever, these units are moved on the tablet's active surface.

MODELS 11, 11A

Model 11 011: (NO LONGER AVAILABLE)

Model 11A

Limitations: The #6351 stylus and #1511 cursor cannot be used concurrently.

All attachment features cannot be used concurrently (#3776, #4010, #4020 and #4025).

Features #3776 and #4010 cannot be used concurrently with power supply features #4050, #0805 or #2730.

Highlights for Model 11

- Has a resolution characteristic of 0.0508mm (0.002 in.).
- The cursor feature provides users with a convenient hand-held "mouse-shaped" unit which has four buttons for application use and a fine cross-hair for precise alignment.
- The stylus feature provides a pen-like device for user interaction with the 5080 system. An indication is provided to the application program when the user activates the stylus tip switch by pressing the stylus tip to the tablet surface. The tactile feedback from pressing the stylus tip assures the user that a selection has been made.
- Can be used for 3250 light-pen emulation using either the stylus or cursor feature.

Highlights for Model 11A

- 5083 model 11A offers a new tablet design, providing a 15 pin "D" style connector plug for attachment of system adapter cables.
- Separate adapter cables and plug combinations provide for attachment to the 5080, RT PC, and the PC, PC XT and PC AT.
- Three new power supply features provide DC power for attachment of tablets to the PC, PC XT and PC AT.
- 5083 tablet model 11A is compatible with 5083 model 11 when attached to a 5080 or RT PC. The Model 11A offers the same high resolution of 500 lines per inch, compact dimensions with an improved appearance, a strong snap-on tilt stand and palm rest to enable the user to work at an angle of 9 degrees, positive screw lock connectors for the attachment of a stylus or cursor, and built in testing capabilities.
- The same special features include a stylus and 4-button cursor. Drawings placed atop the tablet surface may be digitized. Menus may also be placed on top of the tablet and selected. The fine cross-hair in the cursor feature facilitates accurate positioning. Four buttons can be used to transmit additional information to the graphics application program. A stylus can be used for interaction with the displayed image through stylus pen contact with the surface tablet.

- Model 11A (like the model 11) is a light weight unit, with a flexible cable, that can easily be moved about the work space or can be used in the user's lap.

DESCRIPTION

Has dimensions of 216mm (8.5 in.) wide, 279mm (11 in.) long, and 27mm (1.05 in.) deep which includes an active area of 155mm (6.1 in.) by 155mm (6.1 in.). Weighs 1kg (2.2 pounds). Has a thin cable connection to the Peripheral Connection Assembly in the base of the 5081 Display. Snap-on tilt support will increase work angle from 3 to 9 degrees.

Customer Responsibilities: (Except Japan>The customer is responsible for setup and installation of the 5083 and training of the 5083 user.<) (Japan only>Customer Engineering has a setup responsibility for all units in the 5080 Graphics System. The customer is responsible for training the 5083 user.<)

Customer Problem Analysis and Resolution (CPAR): The 5083 is offered with Customer Engineering service under an MMC.

SPECIFY (NONE)

SPECIAL FEATURES

Cursor (#1511): For user interaction with the displayed image through cursor location on the surface of the Tablet. Can also be used to emulate 3250 Light-Pen operation. The cross-hair facilitates accurate positioning. Four buttons can be used to transmit additional information to the graphics application programs. Has cable to connect to the 5083 Tablet. Maximum: One. Field Installation: Yes. Limitations: Cannot be used concurrently with Stylus Feature (#6351).

Stylus (#6351): For user interaction with the displayed image through stylus pen contact with the surface of the Tablet. Can also be used to emulate 3250 Light-Pen operation. Has cable to connect to the 5083. Maximum: One. Field Installation: Yes. Limitations: Cannot be used concurrently with Cursor Feature (#1511).

The following features are also available for Model 11A:

- Cable kit for tablet attachment to 5080 (#3776)
- Cable kit for tablet attachment to 6150 and 6151 RT PC (#4010)*
- Cable kit for tablet attachment to 5150 PC/5160 PC XT (#4020)
- Cable kit for tablet attachment to 5170 PC AT (#4025)
- 120V/60 Hz power supply for PC/PC XT/PC AT (#4050)
- 240V/50 Hz power supply for PC/PC XT/PC AT (#0805)
- 100V/60 Hz/50 Hz power supply for PC/PC XT/PC AT (#2730) (PC, PC XT and PC AT require a power supply)

* The 5083 tablet cable kit (#7586), available as a feature on the RT Personal Computer, is not required for the 5083 model 11A tablet attachment to the RT Personal Computer when 5083 feature code #4010 is ordered.

A diagnostic diskette is included with the 5083 tablet.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5084 DIGITIZER

PURPOSE

The 5084 Digitizer Models 001, 002, and 003 extend the family of products offered by the current 5080 Graphics System. The 5084 is designed to enhance the application opportunity and marketability of the graphic workstation. It will attach to the 5085 M1, M1A, and M2, via the 3270/RS-232-C Attachment Feature, as well as to the 5085 M2A. The 5084 is supported by major applications like Graphics Program Generator (GPG). The 5084 can appear to the application as a 5080 peripheral which means it can be a more integral part of an application's interaction with the end user. The 5084 will be able to attach to any RS-232-C device interface and does not preclude attachment of the 5083 Tablet which can be used in conjunction with the 5084 in a typical workstation.

MODELS

Model 001: 24 X 36-inch active area.

Model 002: 36 X 48-inch active area.

Model 003: 44 X 60-inch active area.

Limitations: The DTE Interface Cable (#9001) cannot be used concurrently with the DCE Interface Cable (#9002) or vice versa.

Maximum: None.

Prerequisites: The 5084 Models 001, 002, and 003 may require changes to the software support for the 5080 Graphics System depending upon the particular application being used. The 5085 M1, M1A, M2, and M2A must be at the latest microcode available at general availability of the 5084. The latest level microcode for the M1 or M1A is 4.1 or higher, the latest level microcode for the M2 is 5.3 or higher and for the M2A the latest level microcode is 6.0 or higher.

To order the above microcode dial the toll free number (800) IBM-5082 to order by mail write to:

IBM Kingston
Dept.31/YB/897
Neighborhood Road
Kingston, N.Y. 12401

The 5085 M1, M1A, and M2 require the 3270 PC/RS-232-C Attachment Feature (#5510). The 5085 M1 must have #6150 and #4651 installed in order to attach the 5084.

The 3270 PC/AT requires the 5084 DCE Interface Cable (#9002) with a Serial/Parallel Adapter (P/N 6450215) and a 3270 PC/AT Serial Adaptor Connector (P/N 6450242). The 3270 PC/AT also requires the latest level GFIS software, GASP/GPG/GIC available at general availability of the 5084.

The 3277 GA requires the latest level GFIS software, GASP/GPG available at general availability of the 5084.

Servicing of 5084s attached to a serial/parallel adapter port of a 3270 PC/AT requires the availability of a 5085 Model 2A or other 5085 Models which meet the hardware and software requirements for attachment of the 5084.

Customer Setup (CSU): Yes.

HIGHLIGHTS

- Local 5085 Processing
- For 5085s with #3005 (5080 Attachment Feature), the 5084 attaches to the 3270 PC/AT via the serial/parallel adapter

- Attaches to 5085 M1, M1A, and M2, using the 3270/RS-232-C Attachment Feature and also the 5085 M2A.
- Programmable Command Set
- Two Output Data Formats (Binary and ASCII)
- Simple customer setup
 - No dip switches to set for supported applications
 - No configuring
- High resolution of up to 1279 lpi
- Many standard features included with each model
- Can be used with the 5083 Tablet to enhance graphic workstation capability.

Standard Features:

- Opaque Surface
- RS-232-C Interface (Both DTE and DCE ports are provided)
- RS-232-C Interface Cable, 25-pin, 12 ft in length (specify)
- Cursor with 16 buttons and 4 indicator lights
- Cursor Holder
- Power Supply/Line Cords (Specify)
- 2 programmable audible tones.

Features and specify codes:

- Extra Cable (#1002) allows for ordering extra DTE and DCE interface cables
- Power Lift Pedestal (#1001)
- RS-232-C Interface Cable (DTE Connection) (#9001) for 5085 Attachment
- RS-232-C Interface Cable (DCE Connection) (#9002) for 3270 PC/AT Attachment

Physical Specifications:

Model 001

Width: 1,233mm (48.5 inches)
Depth: 928mm (36.5 inches)
Height: 58mm (2.3 inches)
Weight: 27kg (60 pounds)

Model 002

Width: 1,492mm (58.7 inches)
Depth: 1,187mm (46.7 inches)
Height: 58mm (2.3 inches)
Weight: 41kg (90 pounds)

Model 003

Width: 1,797mm (70.7 inches)
Depth: 1,390mm (54.7 inches)
Height: 58mm (2.3 inches)
Weight: 52kg (115 pounds)

Pedestal

Width: front 1,168mm (46 inches)
rear 711mm (28 inches)
Depth: 813mm (32 inches)
Height: Min. 724mm (28.5 inches)
Max. 1,232mm (48.5 inches)
Weight: 56kg (125 pounds)

Operating Environment:

Temperature: 10 to 40.6C (50 to 105F)
Relative Humidity: 8 to 80 percent

MACHINES

Publications:

- GA23-2030 5084 Digitizer
- GA23-2032 5084 Digitizer CSU Manual
- GA23-2031 5084 User's Guide
- SY66-0111 5084 MIM and Parts Catalog

The above publications may be ordered by using SBOF-0476-0.

- RS-232-C Interface Cable (DTE Connection), #9001.
- RS-232-C Interface Cable (DCE Connection), #9002.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

SPECIFY

- Power
Specify
50/60 Hz Code P/N
(Japan only>
100V #2807 6247726<)
(Canada only>
120V #9901 6247727<)
- 3270 PC/AT Interface Cable: MFI P/N 6247718, #9002.

5085 GRAPHICS PROCESSOR

PURPOSE

The 5085 has a comprehensive graphics architecture for high function engineering graphics applications. The 5085 is dedicated to the operation of 5080 Graphics Systems units. The 5085 provides a powerful graphics order set with more than 75 orders and also controls the 5081/5085 workstations' display list buffers, concurrent graphics, and 3270 data mode sessions (with the optional 3270 feature) (Models 1A and 2A), peripheral device attachments, and, for example, 6184 and 6186 color plotter attachments, and display functions. It can be used in teleprocessing configurations. It contains up to 1.1 megabytes (Model 001), 4.5 megabytes (Model 01A), 4.5 megabytes (Model 2), or 4.5 megabytes (Model 2A) of system memory. 5085s can also be attached to the RT PC for 5080 Graphics System stand-alone configurations.

The 5085 can also be operated as part of a stand-alone Graphics System when attached to the IBM 3270 PC/AT RT PC Models 20, A25, B25, 25 or 125.

MODELS

Model 1 001 (NO LONGER AVAILABLE): Configurable to individual application requirements.

Model 1A 01A: With more standard features and function than the Model 001. In addition to the features of the Model 001, the 5085 Model 01A includes transformation and clipping function, sixteen colors or gray shades and 512K of system memory as standard. Also, use of the graphics keyboard and the capability to attach to the RT PC Models 20, 25 and A25 is part of the base model 01A.

Model 002 (NO LONGER AVAILABLE): Configurable to individual application requirements.

Model 2A 02A: The 5085 Model 2A increases base system memory, increases the palette of available colors to 16,777,216 million and includes the 3270/RS-232-C feature as standard at no charge.

Hardware Requirements: A 5088 Graphics Channel Controller, a keyboard, or a 3258 Control Unit. 5088s with serial numbers under 4000 need feature code #9150 installed to take advantage of serial link performance enhancements with 5085 Model 2A. Use of the 3258 limits the data rate to/from the 5085 to 1.0 megabits/second. It may be 2.0 megabits/second when using the 5088 -- provided no 3251/3255 workstations are attached. When a 3251/3255 workstation is in the configuration, the data rate must be 1.0 megabytes/second.

Note: The 5088 Graphics Channel Controller is not required when 5080 components are used as part of a stand-alone only Graphics System.

Peripherals: The 5085 controls the following peripherals attached via connectors in the 5085's attached Peripheral Connection Assembly in the tilt-swivel base of the 5081 Display:

- IBM 5083 Tablet (see M5083 pages)
- Dials Feature (see "Special Features")
- Alphameric Keyboard (Japan only) with Katakana keys < > (see "Special Features")
- APL Keyboard (Models 001 only) (see "Special Features")
- Graphics Keyboard (see "Special Features")
- Lighted Program Function Keyboard (See "Special Features")

Other devices are attachable through the 3270 and RS-232-C Attachment Feature (#5510). Two RS-232-C attachment ports are available. For example, both a 7374 and 7375, 7372 and 6180, 6184 and 6186 Color Plotter (in any combination) could be attached at the same time. Other devices attach to the RS-232 video interface (R,B,G) of the 5085 or 5081, i.e., the 5987 Screen Printer and the 5082 Projection System.

Storage:

Models 001 (NO LONGER AVAILABLE):

Model 01A: A base system memory of 512K is provided. The base display list storage available for application use is increased to 320K in the 5085 Model 01A.

Model 02A: 1.5Mb base system memory; the base display list storage available for application use is increased to 720K in the 5085 Model 2A, thus providing over twice the base display list storage of the 5085 Model 2.

Note: The 3270 and RS-232-C Attachment Feature includes an additional 192K of system memory which is used for the 3270 and RS-232-C microcode as well as for host-generated device protocols and data used to communicate with devices attached to the RS-232-C ports. This feature is standard on the 5085 Model 2A, but does not include the the additional 192K of system memory.

HIGHLIGHTS

- 1.5 megabyte base system memory (Model 2A).
- Optional memory expansion to 4.5 megabyte (Model 1A, 2, 2A).
- Compact size for convenient office placement -- fits beside a desk or under a table.
- Can be used in teleprocessing applications, without modification, through attachment to a 5088-1R or a 5088-11R Remote Controller.
- Can be equipped with V.35 attach feature (#4805) for use as a single, remote, V.35 attached workstation (except 5085 Model 2A).
- 3270 data streams and graphics data streams may jointly use the 5085-5088 coax or TP (requires a special feature in the 5088 if serial number is below 4000) link as a "single wire" for both modes.
- Polygon area fill with the following characteristics:
 - Use of solid, or user-defined fill patterns;
 - Filling of 2D objects including those being dynamically:
 - ▲ Transformed (e.g., rotated, scaled, and translated)
 - ▲ Clipped
 - Filling of circles as well as concave and convex objects.
 - Filling of multiple overlapped, and disjointed polygons that contain shapes (islands), and/or crossing sides (bowties).
- Has both fixed and programmable line type and character set generators.
 - Four fixed-line types and four fixed-character sets are provided in the hardware. Fixed characters and line-types are not scaled which facilitates reading of text and easy line type identification when a picture has been scaled.
 - The programmable character generator permits users to define their own vector definitions for any character. These vector-defined characters can be scaled and rotated like any other vectors the 5085 processes. Multiple programmable character sets and line types may be loaded in the 5085 system memory with the active programmable character set and line type dynamically selectable by the user.
- 256 simultaneously displayable color shades from a palette of 16,777,216 colors (Model 2A).

- Automatic mapping of color to monochrome images to facilitate the intermixing of color and monochrome displays (except 5085 Model 2A).
- 3250 graphic order compatibility (Important: See "3250 Compatibility" below).
- Double frame buffers facilitate smooth picture transitions without blanking or flashing.
- A 3D, 64K (X) by 64K (Y) by 64K (Z) virtual world coordinate space.
- 4K by 4K virtual image space mapped to the 1K x 1K real screen coordinates.
- Images generated by a bit-map in the host can be conveniently displayed using a special graphic order.
- Circle generation is provided. This reduces the amount of information from the host required to draw a circle. The circle generation facility also allows circles, which are scaled using this facility, to retain a smooth form without requiring host interaction.
- An audible alarm with volume control.
- A frame buffer write/erase protect function which facilitates animation, menu overlays, and visual detection of vector intersections.
- Design for customer setup. For example, the user can set the addresses of the 5085 and its attachments without CE assistance.
- A 3.5-inch diskette drive with a formatted capacity of 720K/bytes to store the 5085 microcode, error statistics, and configuration data (Except Model 1).
- Model 02A has more standard features and functions. Other features are shown below.
 - 1.5 megabyte base system memory.
 - One megabyte increment of system memory (optional). Maximum: 1.
 - Two megabytes of additional memory via a memory expansion board (optional). Maximum: 1.
 - 4.5 megabyte total memory expansion capability.
 - Transformation and clipping.
 - 256 displayable colors from a palette of 16,777,216 colors.
 - 720K (formatted), 3.5-inch diskette drive.
 - Serial link transmission enhancement.
 - 3270/RS-232-C feature standard.
 - RT PC attachment prerequisites.
 - Hardware tracking cursor, full-screen and 64-bit by 64-bit programmable.
 - Ability to visually detect overlapped geometry (line on line).
 - Pre-selection highlighting.
- (Japan only) The 5085 Graphics Processor provides the following Kanji functions (Note: Kanji is only for graphics applications, not 3270 applications):

Note: Specify #2098 for RT PC Kanji Utility.

 - Kanji input and output.
 - Character set (more than 3,500 characters including an extended non-Kanji character set) plus extended Kanji characters can be displayed by using the programmable character generator capability in the 5085.
 - The character set is the standard national language character set, extended with up to 11 additional engineering graphics symbols. This character set is fully supported by the fixed character generator.
 - The Alphameric/Katakana Keyboard with Kanji conversion control keys (or the Graphics Keyboard, #4651), is used to enter Kanji characters. The Phonetic-to-Kanji

Conversion (PKC) technique, provides an easy way to input Kanji character codes from the keyboard.

- Kanji character fonts, a PKC dictionary, and Kanji (PKC) microcode may be loaded from the host to the 5085 using Graphics Access Method System Product, Release 2. The 512Kb System Memory Feature (Model 1A) and the host PRPQ program (#5799-BPA for five or more workstations; #5799-BPB for four workstations maximum) for Kanji are required. No additional memory is required to run Kanji on the 5085 Model 2A. <)
- Model 01A: The capability of attaching to RT PC Models 20, 25, 125, A25 and B25 is incorporated. This includes the capability to switch the Graphics Keyboard and the 5083 Tablet (cursor pad) between the 5085 model 01A and the RT PC.
- Model 01A: The effective transmission rates from a 5088 Graphics Channel Controller to the 5085 model 01A have been improved for transmission of large blocks of display list data. This improvement will particularly benefit TP configurations. It should be noted that model 001s in the same link will slow the 5085-01As to the rate of the model 001s.

MODEL 02A DESCRIPTION

Model 02A Performance and Functional Enhancements

- Use of the Graphics Keyboard (#4651) with graphics, 3270 and personal computer functions in a stand-alone configuration as well as mainframe interactive operations. The keyboard has the same keyboard layout as that used in the RT PC with keytop engravings to support graphics and 3270 operations. It also has a built-in numeric keypad and plus, minus, multiply, and divide keys.
- A Lighted Program Function keyboard requiring less workspace with more easily visible (particularly from a side view), and bright indicators, and improved stability.
- Eight standard bit planes allow selection of any of 256 concurrently available colors or gray shades.
- The palette has been increased to 16,777,216 colors.
- Hardware full-screen and 64-bit by 64-bit programmable tracking cursor.

In a unit with the same compact dimensions as the 5085 Model 2, the 5085 Model 2A offers users an improved price-performance graphics processor and additional standard features.

The 5085 Model 2A with its additional system memory, its new/enhanced graphics functions, its standard 256 color capability, its larger 16,777,216 color palette, its standard transformation and clipping features, and its 3.5-inch 720K (formatted) capacity diskette drive will enable users to meet the demands of both the fast growing and the newly conceived CAD/CAM applications.

Performance

- Transformations (pipelined) run at the same speed as on the 5085 Model 2.
- Pixel write timing
 - Pixel writes occur at approximately 75ns (nanoseconds) per pixel (vs. 100ns on the Model 1) in any non-horizontal direction
 - Higher speed pixel writing is provided when horizontal lines are drawn or areas are filled by horizontal lines at a maximum speed of 12.5ns per pixel.
 - Boolean operations ("AND", "OR", "INVERT" or "EXCLUSIVE OR" pixels with an application defined mask) occur at the same pixel times (75ns or 12.5ns).
 - Wide lines can typically be drawn two to eight times as fast as on the Model 1.
- High speed solid fill of convex geometric shapes is provided by special convex area fill orders.

- Hardware full-screen cursor provides smoother cursor operation independent of display list order execution, or of picture complexity.
- Serial Link enhancement
 - Effective transmission rates from a 5088 Graphics Channel Controller to a 5085 Model 2A remain constant for transmission of large blocks of display list data. This consistency will particularly benefit TP configurations.

Functional Enhancements: Increased color palette size and the incorporation of some functions that were previously available only as optional features or as RPQs, in the Model 2, make up the functional enhancements in the Model 2A.

STANDARD 2A FUNCTIONS

- Duplicate Geometry Detection: Line-on line capability.
- Users can select a tracking cursor from a predefined set of symbols which includes a full-screen cursor. Applications can also invoke the full-screen cursor or can create their own hardware implemented cursor symbol using a 64-bit by 64-bit array. A color independent of the color table (a 257th concurrent color) can be assigned to the tracking symbol by the user or by the application.
- Pre-Select Highlighting (PSH): This mode automatically highlights elements intersecting the pick window. The application or workstation user via SETUP can select any one of the following highlighting modes:

- First element intersecting the pick window.
- Last element intersecting the pick window.
- All elements intersecting the pick window.

Note: Applications utilizing PSH should complete a display list cycle in 100 milliseconds or less to achieve acceptable interactive visual operation.

- Wide lines with round, square, and flat endings are provided.
- A capability to permit applications to display translucent and/or opaque images is provided through an "under-paint" architectural extension.
- Drawing orders support indirect data so that data may be optionally separated from graphics orders. This is particularly beneficial for applications which make use of instancing. This also conserves display list storage.
- Graphics (graphics, 3270, and personal computer functions) Keyboard: A numeric keypad and 16 dual function keys (providing 32 possible program function keys) are included in the keyboard for the Model 2A. When the 5085 Model 2A is connected to the RT PC, the keyboard and the 5083 tablet can be switched between the 5085 or the RT PC processor via the keyboard. A round and more flexible cable has been provided for attaching the 5085 Model 2A to the connection assembly for peripheral I/O devices.
- A palette supporting 16,777,216 color shades is provided in the 5085 Model 2A. Finer shading and expanded color ranges will be found useful in a variety of applications, particularly in solids modeling, stress analysis, and displays of image data.

The performance and functional enhancements provided by the 5085 Model 2A have been made possible through:

- IBM uniquely designed gate arrays
- Denser and higher speed memory technology
- Improved execution time of the bit-sliced processor with a new, widened 72-bit instruction format and additional control storage

- Additional control storage and registers for the 5085's bit-slice processor to permit more efficient execution of display list orders
- A diskette drive using 3.5-inch diskettes (720K, formatted).

In addition, the following function circuitry is provided in all 5085s:

- Hardware-generated high-speed vector-to-raster conversion.
- A high-speed fixed-character generator is provided by using special, dedicated high-performance memory.
- A separate microprocessor dedicated to handling data transfers between the 5085 and 5088 at the rate of 2 megabits/second. This permits other microprocessors in the 5085 to perform parallel processing of display lists, and peripheral device control.
- High-speed display list-order processing is provided by a 16-bit bit-sliced processor.
- High-speed transformations (scaling, rotating, and translation), with coordinate clipping of 2- and 3-dimensional objects is standard on the Model 2A. These permit image manipulations and successive transformations without interrupting the host application.
- Peripheral I/O units contain microprocessors to offload the 5085 and also provide diagnostic functions.

3250 Compatibility: Many 3250 Graphics Display System applications will work on a 5080 System unchanged. This is due in part to the internal functional compatibility of the two systems, and in part to the way information is displayed on the displays. Drawing the same characters on 3251 and raster technology screens would ordinarily cause the loss of half of any character around the screen border. A special 3250 migration aid ensures that the information shown on a 5081 remains equivalent to that shown on a 3251. The function is an option that can be activated by a user through the configuration and parameter specification function, called "setup".

For teleprocessing applications, 3255s equipped with the appropriate 3255 TP RPQ may be used in TP configuration with 5085s.

3255 Display Control Units and 5085 Graphics Processors can be attached to the same 5088 Graphics Channel Controller or the same 3258 Control Unit.

Compatibility with existing IBM graphics systems, and their related application programs, is provided by GAM/SP Release 2 (5668-978). In addition to supporting all of the advanced graphics functions of the 5080 System, GAM/SP Release 2 also provides host programming support for the 3250 Graphics Display System in a manner compatible with the existing support provided by GAM/SP Release 1 (under VM/SP-CMS, VM/SP HPO-CMS, and VM/XA SF 2.0 and SP-CMS) or Graphics Program Services (GPS) GAM under MVS or VS/1. Existing application programs should run unaltered within the same operating environment.

Although the 5080 System is functionally compatible with the 3250 System for major functions, there are certain incompatibilities due to the use of a raster display (the 5081) to emulate a directed beam display (the 3251) and to certain performance or function differences. These differences are found in the following areas. (See "IBM 5080 Graphics System Principles of Operation", GA23-0134, for details.)

- Vectors with a single endpoint off the screen
- Never-ending display list
- Wrapping of vectors in coordinate space
- Last position of an unprotected field
- Buffer wrap
- Address returned by GEOS (i.e., end of order list)
- End of application
- Time-dependent display list programs

3270 Compatibility: 5080 system operation for 3270 applications requires the 3270 and RS-232-C attachment feature (#5510). This capability is included as standard on the 5085 Model 2A. It is recommended for systems with color 5081 Displays that at least one additional Expansion Pixel Memory feature be added in the 5085 Graphics Processor (only applies to Model 001) to achieve compatibility with color 3270 displays.

For Models 001, 3270 programs can operate with the 5080 system using host systems which support SNA/SDLC 3270 attachment, and applications which use the supported features. IBM-provided programs (e.g., TSO, CICS, IMS, etc.) will also operate with the 3270 mode feature of the 5080 system. Model 01A, 002, and 2A operate in 3270 Mode Shared Attachment (MSA) connection only.

This capability is a standard feature on the 5085 Model 2A.

Note: The currently available 3270 and RS-232-C attachment feature (#5510) supports the Mode Shared Attachment (MSA) mode only. The SNA/SDLC attachment is no longer included.

3270 data streams and graphics data streams can jointly use the 5085 to 5088 to host CPU channel connection. This 3270 MSA mode, or the SNA/TP mode previously offered is selected at setup of the 5085.

The following 3270 functions and attachments are not supported:

- Data entry keyboards
- Numeric lock
- Magnetic slot reader
- Magnetic hand scanner
- Loadable Programmed Symbols (PSS)
- Multiple partitions with scrolling
- Tablet emulation of a light-pen
- Keylock

Physical Specifications:

Model 2A
Width: 321mm (12.6 inches)
Depth: 568mm (22.37 inches)
Height: 590mm (23.23 inches)
Weight: 20kg (44 pounds)
(Model 2 is 29.0kg - 64 pounds)

Customer Responsibilities:

1. Physical planning and site preparation.
2. Providing the required electrical service and facilities. See "IBM 5080 Graphics System Site Planning and Preparation Guide", GA23-0129, for details.
3. (Except Japan) Setup and installation of: The 5085 Graphics Processor and peripheral features (e.g., Lighted Program Function Keyboard, Alphameric Keyboard, Dials) (Japan only) CE has setup responsibility.
4. Ordering and provision of the appropriate cables -- see "Cables" in Specify.
5. Modem and TP line equipment for use with a SNA/SDLC connection of the 3270 feature. (Note: The SNA/SDLC attachment is in the 3270 and RS-232-C attachment feature (#5510) for the 5085 Model 1 only.)
6. Education of 5080 System users.

Maintenance: The 5085 is offered with Customer Engineering on-site service under an MMMC.

3270 AND RS-232-C ATTACHMENT FEATURE

This feature adds both a 3270 feature processor and the ability to attach RS-232-C compatible devices and is standard on the 5085 Model 2A.

3270 Feature: For Model 001: the 3270 feature permits an IBM 5080 Graphics System user to access 3270 applications in host systems which support an SNA/SDLC attachment. Separate and simultaneous interaction with 3270 and 5080 graphics applications can be maintained. The user may alternate images on the 5081 Display by

a simple keyboard action. The integrity of the 3270 display image is preserved by the 5085 Graphics Processor. (The integrity of the 5085 graphics image is maintained assuming a display list capable of regenerating the image is retained in the 5085. This is normally the case.)

Note: The SNA/SDLC attachment is no longer included in the 3270 and RS-232-C attachment feature (#5510). The 3270 feature on Models 1A, 2, and 2A no longer support the 3270 external modem connection; only Mode Shared Attachment (MSA) is supported.

When used with a suitably featured 5088, the 3270 data stream and the graphics data stream can jointly share the 5088 channel connections without need for SNA/TP attachment, modems, TP links, and 37XX/ICA ports.

The 5080 Graphics System supports the data and graphics computing needs of engineers and other professionals in a single workstation by providing access to both 3270 applications and 5080 graphics applications.

The 5080 Graphics System 3270 feature supports the following 3270 functions:

- Base 3270 functions.
- Regular- and high-intensity for each of seven specifiable colors, provided that a color display and at least one additional Expansion Pixel Memory Feature is present (Model 001).
- Screen Sizes (80 characters per line): 12 lines (960 characters), 24 lines (1,920 characters), as the default, 32 lines (2,560 characters), and 43 lines (3,440 characters).
- 132-character line availability (Model 2A only).
- Multiple partitions.
- Extended highlighting: blinking, reverse video and underscore.
- Field validation.
- Audible alarm.
- Alphameric keyboard with 24 Program Function Keys (Model 1 only).
- Alphameric keyboard with 16 Program Function Keys (Models 1A, 2 and 2A).
- APL using the APL keyboard and 12 of the 24 Program Function Keys (Model 1 only).
- TP Communications using:
 - SNA and SDLC protocols.
 - External modems only.
 - Self-Clocked modems only.
 - Speeds up to 9600 bps.

Note: The 3270 Feature may be multi-dropped.

RS-232-C Feature: The 5085 Graphics Processor can have two 25-pin RS-232-C attachment ports which will support devices such as plotters that:

1. Conform to electrical interface specifications, EIA RS-232-C and CCITT V24, and
2. Have a transmission protocol which can be supported using the generalized 5085 RS-232-C attachment interface architecture.

The RS-232-C attachment port can support data transmissions up to 9600 bps for ASYNC. This is suitable for many devices, including the 6184 and 6186 color plotters. Each RS-232-C port is addressed separately by the host application. Activated RS-232-C ports correspondingly reduce the number of 5085s and 3251/3255s that can be attached to the 5088.

When a device is attached to the RS-232-C port, it can run concurrently with the 5080 system graphics and 3270 capabilities. Two areas of 16K bytes each are provided with the feature for

host-generated device protocols and data used to communicate with the RS-232-C attached devices.

This feature is standard on the 5085 Model 2A.

PERIPHERAL DEVICE FEATURES

Alphameric Keyboard (Model 1 only): This feature is a low-profile, cable-attached, EBCDIC typewriter-like keyboard which can be adjusted to any of three surface inclinations matching a user's preferred hand position.

The keyboard has (Except Japan > 104 <) (Japan only > 106 <) keys which may be operated with, or without audible feedback. The key arrangement has four clusters of keys. Three of them are side by side (left to right) with the fourth located at the rear center. The clusters are:

1. 10 keys (2x5) which are used for special functions.
2. (Except Japan > 59 <) (Japan only > 61 <) keys in QWERTY (Japan only > Katakana <) arrangement, plus special standard keys for engineering graphics.
3. 11 keys for cursor control, and special functions, such as shifting between 5080 graphic and 3270 modes.
4. 24 Program Function (PF) Keys arranged in two horizontal rows of twelve. In 5080 graphics mode, these PF keys can be used in place of the first 24 lighted program function keys, if lighted tops aren't required. Normal PF key function is supported in 3270 mode.

The keyboard cable required to attach the keyboard is shipped with the 5085 Graphics Processor.

APL Keyboard (Model 1 only): The APL keyboard has modified keytops to facilitate the entry of 81 specific APL characters. Entry to and exit from APL mode is controlled through a special APL on/off key. In other respects the APL keyboard resembles the Alphameric keyboard. Note: The APL keyboard is supported via the 3270 feature only.

Graphics Keyboard (#4651): (Keyboard only, LPFK not included) attachable to 5085 Models 01A, 002 and 02A. Attachable by special feature #6150 on 5085 Model 1.

This keyboard is designed to be used with both the 5080 Graphics System and the RT PC. It is a low-profile, flexible-cable attached keyboard which can be adjusted easily to one of two surface inclinations to match the user's preferred hand position.

The keyboard has (Except Japan > 101 <) (Japan only > 106 <) keys which can be operated with or without audible feedback. The key arrangement is in four clusters. Three are side by side (left to right) and the fourth is at the left rear. The clusters are:

- (Except Japan > 58 <) (Japan only > 63 <) keys in country national (Japan only > Japanese <) arrangement, plus special standard keys for engineering graphics.

Note: The Alphameric Keyboard (#4631) supported shift lock for all languages and for all keys on the keyboard. This keyboard supports caps lock for U.S., U.K., Sweden, and Italy, and shift lock for German and French keyboards. Caps lock applies only to the alphabetic keys in this cluster and shift lock applies to all keys in this cluster but only in this cluster rather than the total keyboard. The Japanese keyboard has the same four shift capabilities as the alphameric keyboard, but they are invoked in a manner similar to that on the Japanese PC.

- 10 keys for cursor control and special functions such as "Cancel" and "Switch Keyboard".
- 17 keys in a keypad arrangement (including plus, minus, multiply, and divide keys) for easy entry of numbers.

- 16 program function (PF) keys arranged in a horizontal row at the top of the keyboard.

In 5080 graphics mode where lighted keytops are not required, use of upper and lower case shift in conjunction with these 16 PF keys allows the PF keys to emulate all 32 Lighted Program Function Keyboard keys (LPFK #4710). However, nomenclature on this keyboard (#4651) does not map identically to the nomenclature used on the Alphameric (#4631) and APL (#4641) keyboards. For example, PF2 on the new keyboard corresponds to PF3 on the Alphameric and APL keyboards. Normal PF key function is supported in 3270 mode.

Three indicators on the keyboard provide the following status:

- Keyboard association (association with the 5085 or RT PC)
- Numeric Lock Status
- Caps/shift lock status (see note under first key cluster description)

The cable required to attach the keyboard to the 5080 Graphics System is flexible and permanently attached to the keyboard.

Keyboard Language Character Sets: The Graphics Keyboard supports the following language character sets:

- UK English #2958
- US English #2956
- German #2957
- French (AZERTY) #2970 (Note: This is a change from current 5080 National Language Support.)
- Italian #2968
- (Except Japan > Swedish #2962 <) (Japan only > Japanese #2973 (and 3270 Model 5, 132 position, support)

The Japanese keyboard includes keys for conversion to Kanji characters. <)

Note: (Japan only > If the Kanji utility is required when the 5085 is connected to the RT PC, specify #2987 on the 5085. <)

Lighted Program Function Keyboard: The lighted program function keyboard is a separate assembly with 32 keytops in which bright and easily-viewed indicators are imbedded. The LPFK is a more compact, device which has an adjustable surface inclination.

The keyboard indicator lights can be turned on and off under host application control to indicate which keys may be selected at a given moment. Correspondingly, a unique signal is returned to the application for any key pressed. In this way a user and an application may interact. The keyboard functions operate compatibly with 3250 programs.

Dials Feature: Flat, compact, low-profiled, desk-top unit with eight, cone-like dials. The dials may be turned continuously in either direction by easy manipulation with one or more fingers. Upon rotating the dials, a range of scalar values indicating extent of rotation and direction are signaled to the 5085 Graphics Processor. An application can read and interpret this input for any suitable purpose, such as panning, zooming, and rotating 2- or 3-dimensional images.

SPECIFY

- Power (AC, 1-phase):

50 Hz	60 Hz
100V #2807	100V #2807
220V/240V #2801	120V #9901

- Machine Nomenclature:

English UK, US	#2924
French	#2928
German	#2929
Italian	#2932
Japanese	#2930

● Keyboard Language:

English UK	#2958
English US	#2956
French	#2970
German	#2957
Italian	#2968
Katakana	#2973

- 5081 Model 1 Attachment: Specify #9123 to indicate that the 5085 is to be used for attachment of 5081 Model 1 only (requiring a 50 Hz non-interlaced screen refresh rate). If #9123 is not specified, the 5085 will provide a 60 Hz non-interlaced screen refresh rate for the attachment of a 5081 Model 11, 12, 16, or 19 only.

- Cables: For the 5085: Cables from the 5085 to the 5088 or 3258 are a customer responsibility to supply. Cables from the 5085 to the 5081 (three video coaxial cables and the 3.0m (9.8 ft) flat (round on Models 01A and 002, and Model 001 equipped with feature code #6150) ribbon cable with a special connector for the attachment of peripheral devices) are supplied with the 5085.

Note: Modem cables for attachment to modems with EIA connectors or metric connectors are no longer included with #5510.

Cables for the peripheral devices controlled by the 5085, but physically attached to the front of the 5081 Display and the graphics keyboard cable, are supplied with each device except for the Alphameric Keyboard cables which are supplied with the 5085 (Model 001 only). See GA23-0129 for further descriptions.

Due to the redesign of the 5085 model 2A, the W1 cable used in the 5085 Model 1A and 2 is not shipped on the Model 2A. The power necessary to power the peripherals now resides in the 5081 models 16 and 19. If a 5081 Model 11 or 12 is to be used with the 5085 Model 2A, Feature #5003, must be ordered.

SPECIAL FEATURES

Transformation and Clipping Feature (#1021)(Japan only > #2991 <): For Models 001: provides 2D, 3D Transformation (scale, rotate, translate) and 3D viewing capabilities, and sine, cosine, and multiply functions. Maximum: One. Field Installation: Yes.

PCA Cable Attachment (Feature #5003): This feature provides a cable connection from the 5085 Model 2A for the attachment and operation of 5081 Model 011 and 012 displays and other peripherals used in conjunction with these displays. Factory or Field installed.

5080 Attach to 3270 Personal Computer AT (#3005): For Models 1A, 2, and 2A: Provides a dual-screen, single-wire workstation for applications that require concurrent display of high resolution graphics and 3270 alphanumeric on a separate display via a common 3270 data stream. This feature enables a 5085 Graphics Processor to attach to a host system via a 3270 Personal Computer AT attached to a 3174 or 3274 control unit equipped with Distributed Function Terminal (DFT) ports. When used with the Graphics Program Generator (5668-941), Graphics Interface Control (5798-DXC), and Graphics Attachment Support PRPQ (5799-AXX), this combination provides a workstation designed for applications that enter, manage, and display graphical representations of physical objects, and is referred to as a Geographic Facilities Information System (GFIS) workstation. This feature consists of:

- An interface card which is installed in the 3270 Personal Computer AT
- A cable, 15 feet long, to connect the interface card to the 5085
- Installation and users guides for the feature
- Diagnostics and microcode for control and operation of the interface card

● Graphics Interface Control (5798-DXC)

See announcement dated February 24, 1986 for the proper configuration of the 3270 Personal Computer AT. Maximum: One. Customer Setup Unit. MES available.

Expansion Pixel Memory (#3621) (Japan only > #2989 <): (Models 001 and 01A only) Increases color or gray shade capability from base of 4 to 16 in first increment (Model 001 only), 17 to 64 in second increment (first increment on Model 01A; has 16 colors/gray shades standard), and 65 to 256 in third (second, and final increment on Model 01A), and final, increment. Maximum: Three. Field Installation: Yes.

Graphics Processing Enhancement (#3715): The Graphics Processing Enhancement is a no charge factory installed feature on the 5085 Model 1A (#5000). There is no change in the ordering process of an MES for the Graphics Processing Enhancement.

This feature requires #6150 as a prerequisite. This feature enhances graphics processing performance.

Alphameric Keyboard (#4631): (Model 001 only) Has (Except Japan > 104 <) (Japan only > 106 <) keys with QWERTY layout and control keys. Serves graphics and 3270 modes. 24 Program Function Keys (PFK) are normally used for application-specific inputs. They may also be used as Lighted Program Function Keys (without lights). If a Lighted Program Function Keyboard (LPFK -- feature #4710) is attached to the 5085, the 24 PFKs serve as alternates to the first 24 keys on the (32-key) LPFK. If an LPFK is not attached to the 5085, the 24 PFKs may be used as a 24-key LPFK. Attachment cable is shipped with the 5085. Unit has operator-adjustable height, is movable, and has audible indication of character input. Prerequisites: Keyboard Language -- see "Specify". Maximum: One per 5085. Field Installation: Yes.

APL Keyboard (#4641): (Model 001 only) Same as Alphameric Keyboard but with APL symbols activated by an APL on/off key. Prerequisites: Keyboard Language. Maximum: One per 5085. Field Installation: Yes.

Graphics Keyboard (#4651): The keyboard has (Except Japan > 101 <) (Japan only > 106 <) keys. Serves as keyboard for both 5080 and RT PC. 58 (Japan only > 63 <) keys in Country National (Japan only > Katakana <) arrangement, plus special standard keys for engineering graphics. Ten keys for cursor control and special functions. 17 keys for numerics and 16 program function keys. The PF keys may be used in lieu of Lighted Program Function Keyboard (#4710) as 32 PF key functions are provided with the shift key. The audible click may be turned on and off. There are three indicators which show keyboard status. The cable is part of the keyboard. Prerequisite: Keyboard Language - see "Specify". Maximum: One per 5085. Field Installation: Yes.

Lighted Program Function Keyboard (#4710): An improved unit with 32 keytops, each with a brighter and more easily viewed indicator (particularly from a side view). This new LPFK is more stable, more compact, and has an adjustable surface inclination.

V.35 Attach (#4805 factory order or #4807 field install): Provides a V.35 interface for attachment to TP lines. Permits remote TP operation of single 5085-5081 workstations. Note: Remote cluster operation of 5085s does not require the V.35 Attach feature. Attachment is via standard, local coax lines to a 5088-11R Remote Controller. This feature is not supported on the 5085 Model 2A.

Local Attach (#4806): Provides a local (coax) attachment, in place of a V.35 Interface, for attachment of a 5085 to a coax port of a 5088. Features #4805, #4807, #4810, and #4813 must be removed. This feature is not supported on the 5085 Model 2A. Maximum: One. Field Installation: Yes (only).

Note: The installation of the V.35 feature means that the 5085 connection to the RT PC is not available.

3270 and RS-232-C Attachment Feature (#5510): This feature is standard on the 5085 Model 2A and provides 3270 emulation. Also provides two RS-232-C interfaces (Ports) for attachment of up to two devices. The RS-232-C ports support data rates up to 9600 bps for

each ASYNC port and are suitable for attachment of devices such as the 6184 and 6186 Color Plotters. Each RS-232-C port requires a separate host address and, when a corresponding device is attached, reduces the number of 5085 Graphics Processors or 3251/3255 workstations attached to a 5088 Graphics Channel Controller, or to a 3258 Control Unit, by one. Two areas of 16K bytes each are provided with the feature for host-generated device protocols and data used to communicate with the RS-232-C attached devices. Specify: #8888 for metric modem connectors. Maximum: One per 5085. Field Installation: Yes. Note: This feature is required for use of the 3270 Mode Shared Attachment capability. No SNA/SDLC attachment capability is included in current shipments of this feature.

RT PC Attachment Capability (#6150): Provides for 5085 attachment to the RT PC Models 20, A25, and 25. Field Installation only. This feature is standard on the 5085 Model 2A.

Dials (#8710): A separate, compact, desk top unit with eight dials for operator input of scalar values. Each dial discerns 128 discrete values within a dial rotation. The analog action each dial represents is a function of the application program in use. Maximum: One per 5085. Field Installation: Yes.

3270 Mode Shared Attachment Feature (MSA) (#9401): In order to use the 3270 and RS-232-C Attachment Feature (#5510) in an MSA mode, users must specify feature #9401 for 5085s shipped prior to general availability of the MSA feature. This specify is not required if feature #4805 has been installed. Maximum: One. Field Installation: Yes (only). Feature not available on 5085 Model 2A.

Note: The MSA feature is included with 5085 serial numbers 12000 or greater.

1 Megabyte Expanded System Memory (Feature # 5001): An additional 1Mb of expanded system memory may be added to increase the memory of the 5085 Model 2A from 1.5Mb to 2.5Mb. This memory expansion can be factory installed or installed as a field upgrade. Maximum: 1.

2 Megabyte Extended System Memory (Feature #5002): An additional 2Mb of memory may be added via an additional memory board, increasing the memory of the 5085 Model 2A from 2.5Mb to 4.5Mb. This memory extension may be factory installed or installed as a field upgrade. Maximum: 1.

In the 5085 Model 2A, the Expanded System Memory feature (#5001) must be installed as a prerequisite to installing the Extended System Memory feature (#5002).

PCA Cable Attachment (Feature #5003): This special feature provides a cable connection from the 5085 Model 2A for the attachment and operation of 5081 Model 011 and 012 displays, and the 5082 Projection System, without a display and other peripherals used in conjunction with these displays and systems.

MODEL CONVERSIONS (NONE)

ACCESSORIES

- Connector Cable Kit (P/N 6248356): This kit allows daisy-chained 5085's to be disconnected from and connected to a 5080 coaxial link with minimal disruption to the operation of other 5085s. The kit is useful for removing 5085s from the coaxial link for service and for moving a 5085 from one 5088, 5088-1R, or 5088-11R to another.
- This Connector Cable Kit is available to World Trade countries that cannot order the part number. These countries must order feature #5043 in order to receive the Connector Cable Kit.

SUPPLIES (NONE)

5087 MULTICOLOR SCREEN PRINTER

PURPOSE

A Printer for the color or monochrome 5081 Display. The printer attaches via the standard video output for the 5081 or 5085. The 5087 Screen Printer attaches to a single 5081 Mdl's 1, 2, 11, and 12 or 5085 Mdl's 1, 1A and 2. The Multiplexor, feature code #4000, provides for up to four 5081 IBM Graphics Displays to share one 5087 Screen Printer.

MODELS

Model 1 001: The 5087 may attach to a single 5081. The Multiplexor, feature code #4000, allows for up to four 5081 Graphics Displays of all models to share one 5087 Screen Printer.

HIGHLIGHTS

The 5087 provides a high quality, high resolution, seven color or monochrome hardcopy of an 5080 screen image via a thermal transfer process on either an A size or A4 size sheet of paper or A size transparency. The 5087 connection is to the video interface of any model of the IBM 5085 or 5081. This new addition to the 5080 Graphics System family of products provides a convenient paper or transparency hardcopy of the 5081 screen image without requiring modification to any existing 5080 Graphics System hardware or software. A fully buffered video interface in the 5087 allows the user to store the 5081 image in less than 4 seconds. After the image is stored, the rest of the 5080 system may be used without impacting the 5087 Screen Printer or the 5080 System performance. A single copy color output takes approximately 65 seconds to process and a single monochrome copy takes approximately 30 seconds to process in a normal office environment.

The 5087 is compatible with the 50 Hz non-interlaced screen refresh rate for the 5081 Mdl's 1 and 2 Displays and the 60 Hz non-interlaced screen refresh rate for the 5081 Mdl's 11 and 12. The Multiplexor, feature code #4000, provides for up to four 5081 Graphics Displays to share one 5087 Screen Printer thus providing a cost reduction per 5081 work station for the 5087.

- Monochrome or seven color copy output is available. The seven colors are red, green, blue, cyan, yellow, magenta and black.
- Attachment to all models of the 5081 via the unused RS 343 video output ports.
- Easily replaceable ink roll, paper and transparency.
- Easily accessible front panel controls and indicators for operator usage.
- Small footprint allows the 5087 printer to fit on a worksurface about 381mm x 381mm (15 x 15 in.).
- Compact external dimension are approximately: 236mm (9.3 in.) high x 401mm (15.8 in.) wide x 503mm (19.8 in.) deep.
- Screen image copy on either paper or transparency.
- Resolution of approximately 135 dots per inch in both the horizontal and vertical direction. This yields an image of approximately 193mm x 193mm (7.6 in. x 7.6 in.).
- ANSI A (8.5 in. x 11.0 in. or 215 cm x 280 cm) and ISO A4 (8.27 in. x 11.69 in. or 210 cm x 297 cm) for paper and A size for transparencies.
- A remote print switch with a thin, flexible 6.0m (19.7 ft) cable is included with the 5087 Printer.

Physical Specifications:

Height: 236mm (9.3 in.)
 Width: 401mm (15.8 in.)
 Depth: 503mm (19.8 in.)
 Weight: Approximately 22.7 Kg (50 lbs.)

Cables and Connectors: Three 75 ohm coaxial cables each 6.0m in length and color coded red, green and blue are provided with the 5087. There are 75 ohm BNC connectors at both ends of these cables. A detachable power cable is provided with the 5087 to accommodate the various power sources for worldwide distribution.

Customer Responsibilities:

- Physical Planning and site preparation
- Provision for electrical service and facilities

See the "IBM 5087 Users Guide", GA23-2004, for general information on the above responsibilities.

Service Responsibilities: The 5087 is offered with Customer Engineering on-site service under an MMC.

SPECIFY

- Power (AC, 1- phase):

100V	#2807
120V	#9901
220V	#2813
240V	#2801

- Machine Nomenclature:

English UK	#2924	German	#2929
English US	#2924	Italian	#2932
French	#2928	Japanese	#2930

SPECIAL FEATURES

Multiplexor (#4000): Provides for up to four 5081 Graphics Displays to share one 5087. This feature provides an effective cost reduction per 5081 work station for the 5087. Different models of the 5081 can be mixed on the same 5087 with the multiplexor feature installed. Warranty is same as Base Printer. The Multiplexor will be installed by an IBM National Service Division Representative.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

The following supplies are available worldwide through the IBM National Distribution Division:

IBM 5087 Transparency ANSI A size (P/N 6246228): 1 Roll - 100 8-1/2 in. x 11 in. sheets per roll. Provides high quality transparencies for overhead projection.

IBM 5087 Paper ANSI A size (P/N 6246229): 4 Rolls - 300 8-1/2 in. x 11 in. sheets per roll. Special process paper provides optimal compatibility with the thermal transfer process.

IBM 5087 Paper ISO A4 size (P/N 6246230): 4 Rolls - 300 210 cm x 297 cm sheets per roll. Special process paper provides optimal compatibility with the thermal transfer process.

IBM 5087 Monochrome Ink Roll (P/N 6246231): 4 Rolls - 300 prints per roll.

IBM 5087 Color Ink Roll (P/N 6246232): 4 Rolls - 100 sheets per roll. Seven colors: A three color (cyan, magenta and yellow) blend to form four additional colors: (red, green, blue and black).

IBM 5087 Printhead Cleaner (P/N 6246233): 4 per package - Average approximate yield: 1000 prints/cleaner.

5088 GRAPHICS CHANNEL CONTROLLER MODELS 1, 2

THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT

PURPOSE

The 5088 operates as a shared, high-speed control unit to 5081/5085 or 3251/3255 workstations. It can attach to a S/370, 4300 or 30XX channel with a channel data rate of up to 2.5 megabytes/second in data streaming mode, or up to 1 megabyte/second in conventional channel mode. Its functional compatibility with the 3258 permits both 3255s and 5085s to be attached. A special feature for tele-processing attachment permits remote attachment of 5085-5081 workstations, 3255-3251 workstations, or 5088-01R Remote Controllers. Since 5085s may also attach to the 3258, there is the capability to mix units from the 5080 Graphics System and the 3250 Graphics System.

MODELS 1, 2

MODEL 1 001: Permits the local or remote attachment of up to a maximum of 16 5081/5085s, 3251/3255s, and RS-232-C* compatible devices. (In a 5085-only environment, the link between the 5088 and the 5085 can operate at 2 megabits/second. In a 5085 and 3255, or a 3255-only configuration, the link speed is limited to 1 megabit/second on a local (coax) link and 750 Kb on a TP link.)

MODEL 2 002: Provides the same attachment as the model 1 for the first set of 16 5081/5085s, 3251/3255s and RS-232-C-compatible devices. The model 2, in addition, provides for the attachment of a second set of 16 5081/5085s, 3251/3255s and RS-232-C-compatible devices with the same capabilities. This allows a maximum attachment capability of 32 workstations.

Each RS-232-C-compatible device connected to a 5085's 3270 and RS-232-C attachment feature correspondingly reduces by one the number of workstations which may be attached to the 5088. This applies, for example, to attachment of the 7374 and 7375 color plotters.

Channel Attachment: Requires a control unit position on a system channel. The 5088 will attach to a Block Multiplexer, Selector, or Byte Multiplexer (burst mode only) Channel. The 5088 will attach only to a Block Multiplexer Channel on the 3090.

Prerequisites: A 3255 model 2 must have EC 384549 installed if it is attached to a 5088 model 1 or 2. (All 3255 model 2s with serial number 17734 or higher have already had EC 384549 installed at the factory.)

HIGHLIGHTS

Has the same physical dimensions as the 5085 Processor for easy placement relative to the host channel.

Attaches to all S/370, 4300, 30XX channel interfaces at a maximum distance of 121.9m (400 ft). Operates on block multiplexer, selector, or byte multiplexer (burst mode only) channels.

- Minimizes channel overhead for transmissions greater than 32K by using channel data buffering of approximately 64K.
- Can be equipped with a V.35 Attach feature (#4808).
- Provides new channel command capabilities which permit applications to use advanced or extended functions in the 5085 Graphics Processor. These capabilities include:
 - Control of display lists that are greater than 64K bytes.
 - Select Write/Read memory area commands for minimizing channel utilization on large writes/reads.

- Loading of programmable vector character sets (Japan only) including Kanji (<) into system memory.
- Controlling allocation of 5085 memory for functions such as large polygon fills which require more than the default workspace.
- Overlapping of device processing.

Note: The 5088 also supports the 3258 channel commands in order to assist existing 3250 users in either mixing 5080 systems with 3250 systems or to permit the use of the currently available GAM or GAM/SP1 access methods. When the 5088 execution is limited to 3258 channel commands, the performance characteristics of the 5088 may be less than those of the 3258 depending upon the amount of data which the application reads from the terminals. If the reading frequency and/or volume of input data is low, then the 5088 performance should be comparable to a 3258. (This is normally the case for the IBM-supported CAD/CAM applications.)

- Provides additional 5085 sense information to assist in fault isolation, program debugging, etc. Sense information is provided separately for each 5085 device.
- Provides additional RAS capabilities:
 - Enhanced 5088/5085 link problem determination capabilities.
 - Improved error detection.
 - I/O error alert.
 - Machine check broadcast to 5085 with optional automatic restart of the 5088.
- Can be powered on/off remotely from the host CPU (via the standard power control interface).

Physical Specifications:

	Model 1	Model 2
Width	320.6mm (12.6 in.)	320.6mm (12.6 in.)
Depth	568mm (22.3 in.)	568mm (22.3 in.)
Height	590mm (23.23 in.)	590mm (23.23 in.)
Weight	22.7kg (50 lbs.)	24.5kg (50 lbs.)

Cables: Cables to the S/370, 4300, 303X, or 308X processor must be ordered. Cables to the 5085/3255 are a customer responsibility to supply.

The 5088 uses either 3250 type (75 ohm) cable or 3270 type (93 ohm) cable for attachment to 5085 Processors.

Note: The maximum distance between the 5088 and a locally (coax) attached 5085 depends upon the attenuation characteristics of the cable and any (customer-supplied) connectors. Use of RG-59/U (75 ohm) and RG-62/AU (93 ohm) cable (used in many 3270 installations) permits attachment up to 1,000m (3,280 ft.) apart. The use of special low-loss 75 ohm impedance coaxial cable will permit attachment up to 5,000m (16,400 ft.) apart. See "IBM 5080 Graphics System Site Planning and Preparation Guide", GA23-0129, for details.

Customer Responsibilities: The customer is responsible for:

1. Physical planning and site preparation.
2. The provision of the required electrical service and facilities. (See "IBM 5080 Graphics System Site Planning and Preparation Guide", GA23-0129, for details on the above responsibilities.)

3. Ordering of cables to the S/370, 4300, or 30XX processor.
4. Provision of cables to the 5085/3255.
5. Ordering and installation of TP facilities for use with the V.35 Attach feature (#4808).

Customer Problem Analysis and Resolution: The 5088 is offered with CE on-site service under an MMMC.

SPECIFY

- Power (AC, 1-phase):

50 Hz	60 Hz
100V #2807	100V #2807
200V #2733	120V #9901
220V #2813	200V #2733
240V #2801	208V #9902

- Machine Nomenclature:

English UK, US #2924	Italian #2932
French #2928	Japanese #2930
German #2929	

SPECIAL FEATURES

V.35 Attach (#4808): Provides V.35 teleprocessing interface. Single 5085-5081 graphics workstations equipped with a V.35 Attach feature, or 3255-3251 workstations equipped with either TP RPQ 7J14 or SU91, may also be TP-linked to a 5088 mdl 1 or mdl 2. Maximum: One per 5088 mdl 1. Two per 5088 mdl 2. Field Installation: No.

V.35 Attach (#4809): Provides V.35 teleprocessing interface. Single 5085-5081 graphics workstations equipped with a V.35 Attach feature, or 3255-3251 workstations equipped with either TP RPQ 7J14 or SU91, may also be TP-linked to a 5088 mdl 1 or mdl 2. Maximum: One per 5088 mdl 1. Two per 5088 mdl 2. Field Installation: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5088 REMOTE CONTROLLER MODEL 1R

(NO LONGER AVAILABLE)

PURPOSE

A TP-linked Remote Control Unit for the 5080 Graphics System for attachment of remote, coax-attached, 5085-5081 or 3255-3251 workstations. The TP link, via a V.35 interface and the appropriate modems and TP line, is to a 5088 Graphics Channel Controller. Up to 16 graphics workstations, or RS-232-C attached devices, may be attached.

MODEL 1R

Model 1R 01R: Permits the attachment of up to a maximum of 16 remote devices (the total of 3255/3251s and RS-232-C* compatible devices).

* Each RS-232-C compatible device connected to a 5085's 3270 and RS-232-C Attachment feature (#5510) correspondingly reduces by one the number of workstations that may be attached to the 5088-1R. This applies, for example, to attachment of the 7374 and 7375 color plotters.

5088 Graphics Channel Controller Attachment: Attachment to a 5088 is via a V.35 interface and TP link to a TP Attach Featured (#4808) 5088.

HIGHLIGHTS

- Has the same physical dimensions as the 5088 Graphics Channel Controller and the 5085 Graphics Processor for easy placement at the remote location.
- Attachment of 5085/5081 display workstations is via coax. No modification of a locally-attached 5085/5081 workstation is required to connect it to a 5088-1R.
- Compatibility of the 5080 and the 3250 Graphics Systems is extended to include V.35 attachment. 3255/3251s attach locally to a 5088-1R.
- The V.35 interface can accommodate line speeds up to 2 megabits/second. (3255 maximum is 750kb.) This allows use of, for example, microwave and CATV circuits as well as the high-speed TP offerings now available from PTTs or other communications services.

Physical Specifications:

Width - 320.6mm (12.6 in.)
Depth - 568mm (22.3 in.)
Height - 590mm (23.23 in.)
Weight - 22.7kg (50 lbs.)

Cables: The 5088-1R uses either 3250 type (75 ohm) cable or 3270 type (93 ohm) cable (mutually exclusive on the same 5088 link), or the IBM Cabling System for attachment to 5085 Graphics Processors. Note: The maximum distance between the 5088-1R and a 5085 depends upon the the attenuation characteristics of the cable and any connectors (customer-supplied). Use of RG-59/U (75 ohm) and RG-62/AU (93 ohm) cable (used in many 3270 installations) permits attachment up to 1,000m (3,280 ft.) apart. The use of special low-loss 75 ohm impedance coaxial cable will permit attachment up to 5,000m (16,400 ft.) apart. See "IBM 5080 Graphics System Site Planning and Preparation Guide", GA23-0129, for details.

A modem cable and wrap plug is supplied with each 5088-1R.

Any other cables or connectors required for attachment to the TP link are the customer's responsibility to supply.

Customer Responsibilities:

- Physical planning and site preparation.
- The provision of the required electrical service and facilities (see "IBM 5080 Graphics System Site Planning and Preparation Guide", GA23-0129, for details on the above responsibilities).
- Provision of cables to the 5085/3255.
- Installation and setup of 5088-01R.

Customer Problem Analysis and Resolution (CPAR): The 5088-1R is offered with CE on-site service under an MMMC.

SPECIFY

- Machine Nomenclature:

English UK, US	#2924	Italian	#2932
French	#2928	Japanese	#2930
German	#2929		

- Multidrop Address (#910A): Specify #910A and state address to be used in a multidropped configuration. Addresses 01 to 08 may be specified as:

Specify	Address
#9101	01
#9102	02
#9103	03
#9104	04
#9105	05
#9106	06
#9107	07
#9108	08

Field changes to the addresses require a CE.

- TP Speed Range (#9002): The TP speed range switch will be set at the plant for low speed. If the following condition exists, specify #9002 to set the range to high speed:

The data rate is greater than or equal to 250K bps and Request to Send (RTS) to Clear to Send (CTS) delay equals zero.

- Non-Return To Zero Inversion (NRZI) (#9003): The 5088-1R will be set for NRZI encoding unless #9003 is specified to NRZI encoding off. NRZI encoding must be off if the 5088-1R is used in a mixed TP configuration with 3255s. (Note: Locally (coax) attached 3255s may be used on the 5088-1R with NRZI encoding turned on.) Field changes for NRZI switches require a CE.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5088 GRAPHICS CHANNEL CONTROLLER REMOTE CONTROL UNIT MODEL 11R

PURPOSE

The new 5088 Model 11R Remote Control provides a reduced physical size, and a substantial price reduction. The new model is the functional equivalent of the 5088 Model 1R. Technical enhancements permit telecommunications controller and the interface adapter to reside on a single planar board.

Graphics Channel Controller. Up to 16 graphics workstations or RS-232-C attached devices may be attached.

Each RS-232-C compatible device connected to a 5085 RS-232-C port correspondingly reduces by one the number of workstations that may be attached to the 5088 Graphics Channel Control unit.

Standard Features:

Physical Specifications:

Width - 415mm (15.75 inches)
Depth - 444mm (16.75 inches)
Height - 120mm (4.75 inches)
Weight - 7.25kg (16 pounds)

Operating Environment:

Temperature - 10.0 to 40.6 degrees C (50 to 105 degrees F)
Relative Humidity - 8 to 80 (percent) noncondensing

Publications:

The following materials are available.

- IBM 5080 Graphics System Site Preparation and Planning Manual (GA23-2041)
- IBM 5085 Graphics System 5088 Maintenance Information Manual (SY66-0113)
- IBM 5088 Remote Controller Setup Instructions (GA23-2037)

MODEL 11R

Limitations: Each RC-232-C compatible device connected to a 5085's 3270 and RS-232-C Attachment Feature correspondingly reduces by one the number of workstations that may be attached to the 5088 Model 11R. This applies, for example, to attachment of the 7374 and 7375 color plotters.

Prerequisites: The 5088 11R Remote control unit requires a 5088 and RS-232-C compatible devices to function properly.

Customer Setup (CSU): The 5088 Model 11R is a Customer Set-up (CSU) unit. The CSU allowance is one day.

HIGHLIGHTS

- Lower price
- 16 device attach capability
- Smaller physical size, desk top placement
- V.35 interface
- Digital LED and pushbutton switches

Optional Features:

- Multidrop Address (#910A):** Specify #901A and state address to be used in a multidrop configuration. Addresses 01 to 08 may be specified as: (Field Changes to the address require a CE)

Specify	Address
#9101	01
#9102	02
#9103	03
#9104	04
#9105	05
#9106	06
#9107	07
#9108	08

- TP Speed Range (#9002):** The TP speed range switch will be set at the plant for low speed. If the following condition exists, specify #9002 to set the range to high speed: The data rate is greater than or equal to 250K bps and Request to Send (RTS) to Clear to Send (CTS) delay equals zero.

- Non-Return to Zero Inversion (NRZI) (#9003):** The 5088 Model 11R will be set for NRZI encoding unless #9003 is specified to NRZI encoding off. NRZI encoding must be off if the 5088 Model 11R is used in a mixed TP configuration with 3255s.

DESCRIPTION

The 5088 Model 11R is a TP-linked Remote Control unit for the 5080 Graphics System for attachment of remote, coax-attached, 5085-5081 or 3255-3251 workstations. The TP link, via a V.35 interface and the appropriate modems and a TP line, is to a 5088

SPECIFY

Attachment of a 120V power source is supplied as standard. Plugs supplied are non-locking. The line cord supplied is 9 feet long. Specify #9986 if a 6-foot line cord is required.

Machine Nomenclature

English UK, US #2924 French #2928 German #2929 Italian #2932 Japanese #2930

Multidrop Address (#910A): Specify #910A and state address to be used as a multidropped configuration. Addresses 01 to 08 may be specified as:

Specify	Address
#9101	01
#9102	02
#9103	03
#9104	04
#9105	05
#9106	06
#9107	07
#9108	08

Field changes to the addresses require a CE.

TP Speed Range (#9002): The TP speed switch will be set at the plant for low speed. If the following condition exists, specify #9002 to set the range to high speed:

The data rate is greater than or equal to 250K bps and Request to Send (RTS) to Clear to Send (CTS) delay equals zero.

Non-Return To Zero Inversion (NRZI) (#9003): The 5088-11R will be set for NRZI encoding unless #9003 is specified to NRZI encoding off. NRZI encoding must be off if the 5088-11R is used in a mixed TP configuration with 3255s. (Note: Locally (coax) attached 3255s may be used on the 5088-11R with NRZI encoding turned on.) Field changes for NRZI switches require a CE.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

SUPPLIES (NONE)

5110 COMPUTER MDL 3
[NO LONGER AVAILABLE]
PURPOSE

Designed to address a wide variety of commercial and problem solving applications in both the small and large business.

MODELS

The 5110 model 3 is the processor for the 5120 Computing System. The following chart gives the model number by memory size and programming language.

Models	Languages	Main Storage Bytes
A31	APL	16K
A32	APL	32K
A33	APL	48K
A34	APL	64K
B31	BASIC	16K
B32	BASIC	32K
B33	BASIC	48K
B34	BASIC	64K
C31	APL and BASIC	16K
C32	APL and BASIC	32K
C33	APL and BASIC	48K
C34	APL and BASIC	64K

Customer Setup (CSU): The 5110 mdl 3 is designated as Customer Setup. The Marketing Representative/BCC must advise the customers of their responsibilities before receipt of the machine. For information on CSU, contact IBM. Use of the *Information Bulletin for Customers-Customer Setup* (G120-2743) is required.

HIGHLIGHTS

- User-oriented data processing.
- Built-in high level interactive language ... APL, BASIC, or both.
- Integrated diskette storage of 2.4 megabyte capacity.
- Nine-inch CRT display screen.
- Easy-to-use keyboard for programs and data.
- Audible Alarm, standard.
- Composite Video Adapter, standard.
- Optional Asynchronous or Binary Synchronous Communications Adapters.
- Optional Serial I/O Adapter via (Canada only) EIA Standard RS-232-C +) (Except Canada) CCITT V.24/V.28 +).
- Optional Diskette Sort feature.

Features:

- Metal Oxide Semiconductor Field Effect Transistor (MOSFET) main storage.
- 530 nanosecond main storage cycle time.
- Internal parity checking.
- All features (Japan only) except Katakana (#2973) +) are field installable. Upgrades are field installable.
- Main storage available in 16K, 32K, 48K, or 64K bytes. **Note:** The language interpreters utilize part of main storage which is not available to the user, with BASIC this amounts to 4,624 bytes and with APL it is 6,915 bytes.

Keyboard: It has a familiar typewriter layout plus a numeric keypad. Four arithmetic operator keys located to the right of the numeric keypad provide convenient data entry in desk calculator mode. With a BASIC machine, the keys on the 10-key pad can be programmed by the user to perform special functions. These functions are activated by the COMMAND key. Keytops indicate special characters for APL and/or BASIC, depending on mdl. The top row of typewriter keys provides machine commands when depressed with the COMMAND key. Frequently used APL and/or BASIC statements are printed on the front of the keys. The user may then enter a statement keyword, such as GOTO or PRINT, by pressing the COMMAND key and the appropriate word key. The primary purpose of the COMMAND key is to make use of the 5110 mdl 3 easier and faster.

Display Screen: Is used to display keyed input, provide user guidance and display output. Up to 1,024 characters can be displayed on the nine-inch screen 16 lines of 64-characters each. Under program control, the user is permitted full-screen management and display of upper/lower case characters.

Interactive Languages: Implemented in three options within Read Only Storage (ROS): APL, BASIC and a combined APL/BASIC. With a combination machine, the language is selectable with a switch and a combined APL/BASIC keyboard is provided.

Input/Output Operations: Provide for update-in-place and Record I/O with Diskette.

Customer Support Functions: Are distributed with the 5110 mdl 3 on diskette. The functions provided include a relocatable loader, diskette initialize, diskette compress, diskette-to-diskette copy, diskette recovery and label display. Also included, but applicable only to 5110 mdl 1s, are: Tape-to-tape copy, tape-to-diskette copy, tape header recovery, tape data recovery and diskette-to-tape copy.

Composite Video Adapter: Provided for simultaneous display of CRT data on additional screens.

Audible Alarm: The audible alarm is provided to signal "system attention required" and under program control, operator messages like "end of job".

Customer Responsibilities: The customer is responsible for:

- The customer is responsible for providing a desk or table-top to support the 5110 mdl 3.
- Making arrangements for installation, pricing, and charges for the data communications facility and attachment of selected data sets.
- Toll charges, if required for installation and/or maintenance of BSCA, are to be paid by the customer.
- The IBM Marketing Representative/BCC must have the customer obtain a firm installation date for transmission service (including modems) before the order, BSCA (#2074), can be confirmed. For further information refer to "Teleprocessing Systems" and M2700 pages.

The customer must be advised *in writing* that he is responsible for:

- Attaching a device which meets the defined (Canada only) EIA Standard RS-232-C +) (Except Canada) CCITT V.24/V.28 +) Specifications (Interface Type D) for Serial I/O.
- Assuring with the device manufacturer the time between data transfer is sufficient for their application.
- Supporting the I/O device with APL or BASIC programs.
- Determining program storage requirements.
- Maintenance of common carrier facilities/services as well as the IBM equipment. For further information see M2700 pages and "Teleprocessing Systems".

SPECIFY

- Power (AC, 1-phase, 3-wire grounded):

50 Hz	60 Hz
100V #2804	100V #2730
220V #2813	120V #9911
240V #2801	

- Color: Pearl white

- Machine nomenclature:

English #2927	Italian #2932
French #2928	Spanish #2731
German #2929	

- Keyboard Language Groups:

English/Australian #2956	Italian #2968
French #2964	Japanese English #2955
French Canadian #2977	Japanese Katakana #2973
German #2957	Spanish #2960
International #2950	Spanish Speaking #2969

- Cables:

- Standard Power - 1.8 meters (6 feet)

5110 Computer Mdl 3 (cont'd)

- Asynchronous Communications Adapter (#1525) - 1.8 meters (6 feet)

(Canada only+)

- EIA Interface (#3701) - 6 meters (20 feet) +)

(Except Canada+)

- CCITT Interface (#3701) - 6 meters (20 feet) +)
- Serial I/O (#6301) - 1.8 meters (6 feet)

SPECIAL FEATURES
NON-COMMUNICATIONS FEATURES

Expansion Feature (#1524): A prerequisite for attachment of the Asynchronous Communications Adapter (#1525) or the Serial I/O Adapter (#6301). **Limitations:** See "5120 Computing System Configuration Considerations". **Maximum:** One. **Field Installation:** Yes.

Channel Terminator (#1600): Required when the 5103 Printer is not attached. It logically and physically provides load termination to the channel. **Field Installations:** Yes.

(Japan only+)

Katakana Feature (#2973): This feature provides a 128-character set consisting of 47 Katakana symbols, 26 upper case alphabetic characters, 10 numeric characters and 29 special characters. To achieve this, the same number of keys are retained with added character choices obtained by using the KANA ON and KANA OFF commands. Katakana mode can be initiated at the keyboard or through program command. All characters are displayed and are printable on the 5103, mdl 11 and 12, equipped with Katakana (#2973). This feature is available on all 5110 mdls and will operate in conjunction with all special features except the Asynchronous Communications Adapter (#1525), which must use standard 5110 mode. When the Katakana feature is not in use, the 5120 Computing System retains all of its standard characteristics except for the National Use Character Graphics. The Katakana feature does not impose any limits on possible system configurations.

Note: When ordering Katakana:

- Do not specify nomenclature feature code.
- Specify #2973 for Katakana Keyboard Language Group.

This will result in both Japanese nomenclature and Katakana Keyboard Feature for 5110 mdl 3. **Maximum:** One. **Field Installation:** No **Prerequisites:** None on 5110 mdl 3. #2973 on 5103. +)

Diskette Sort (#3200): Provides the 5110 mdl 3 user with the ability to sort diskette data files. Both full-record sorts and address-out (ADDROUT) sorts are possible. The sort resides in ROS and can be initiated through the system language or the keyboard. **Maximum:** One. **Field Installation:** Yes.

Serial I/O Adapter (#6301): Provides the 5110 mdl 3 with the capability to attach anyone of a variety of peripherals which satisfy(Canada only+ EIA Standard RS-232-C +)(Except Canada+ CCITT V.24/V.28 +) Specifications. The customer may select 5-, 6-, 7-, or 8-bit code rates from 20 to 9600 bps (2400 maximum for 5-bit). Interaction with an attached device is through the APL or BASIC languages. **Limitations:** May not be installed with Asynchronous Communications Adapter(#1525) if Binary Synchronous Communications Adapter (#2074) is installed. See "5120 Computing System Configuration Considerations". **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #1524. **References:** For Serial I/O Feature, refer to the *Site Preparation Manual* (GA34-0130) for information concerning attachment requirements for the 5110 mdl 3 Serial I/O Adapter.

COMMUNICATIONS FEATURES

Asynchronous Communications Adapter (#1525): Provides the 5120 Computing System with the capability to appear as 2741 (using EBCDIC or Correspondence notation) to a remote system. The customer may select 134.5 bps or 300 bps start/stop transmission speeds, depending upon the remote system. Operation will be over appropriate B1, B2, C1, C2, and D1 facilities. Line connection is through a customer-supplied modem. The 5120 Computing System is supported in stop/start mode connected to a S/370, 303X, or 4300 Processor via an Integrated Communications Adapter (ICA), a 3704/3705/3725 Communications Controller with the Emulation Program (EP/VS), or the Network Control Program (NCP/VS). See M2700 pages for details concerning the facilities and prerequisites on these units. When in asynchronous communications mode, the 5120 Computing System is supported as a 2741 by the following:

SCP	Options	TP Access Methods
OS/VS1	TSO (via TCAM)	BTAM, TCAM, or VTAM
OS/VS2		BTAM, TCAM, or VTAM
DOS/VS		VTAM
VM/370		

In the asynchronous communications mode, the 5110 mdl 3 keyboard will be used in the same way as a 2741 keyboard. Output will be displayed on the CRT and may be printed on an optional printer. The user may also use the diskette to transmit and receive data from the remote system. While in the asynchronous communications mode the 5120 Computing System is a dedicated terminal device. Therefore, interaction with the APL or BASIC interpreter takes place only after the session is completed. **Limitations:** May not be installed with Serial I/O Adapter (#6301) if Binary Synchronous Communications Adapter (#2074 is installed). See "5120 Computing System Configuration Considerations". **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** A customer-supplied modem meeting (Canada only+ EIA RS-232-C +)(Except Canada+ CCITT V.24/V.28 +) Specifications and #1524.

References:

- See M2700 pages for additional information concerning communication facilities, machine attachment requirements, operating capabilities and customer responsibilities.
- *IBM General Information and Site Preparation Manual* (GA34-0130), for physical installation requirements.

Notes:

- For questions regarding emulation of 2741 features and/or RPOs, contact your regional General Systems Center (GSC).
- The functions of Receive Interrupt and Transmit Interrupt features on the 2741 are standard with the 5110 mdl 3 Asynchronous Communications feature, but require full-duplex modems. OS/VS BTAM does not support the transmit interrupt feature.

Bi-Sync Comm. Adapter [BSCA] (#2074): In conjunction with APL or BASIC program control, this feature permits the 5120 Computing System to function on a switched or nonswitched (leased or private) communications line as a processor terminal emulating 3741 line protocol with:

- A S/3 equipped with BSCA (#2074 or #2084) or BSCC (#2094).
- A S/32 equipped with BSCA (#2074)
- A S/34 equipped with Communications Adapter (#2500, #3500 or #4500).
- A S/36 (5360) equipped with Communications Adapter (#2500 or #4500).
- A S/36 (5362) equipped with Communications Adapter (#2910 or #2915).
- A 5110 equipped with BSCA (#2074).
- A 5120 Computing System equipped with BSCA (#2074).
- A 5265 communicating mdl (point-to-point, batch communications only).
- A 3741 mdl 2 or 4.
- Or when emulating 2770 line Protocol with: A S/370, 303X, or 4300 Processor, which is supported by OS/VS1, OS/VS2, TCAM, DOS/VS BTAM via an Integrated Communications Adapter, or a 3704/3705/3725 Communications Controller with NCP or EP, any of which are equipped with a binary synchronous adapter and appropriate sub-features.

This feature will operate with any of the above systems capable of communicating at the following nominal transmission rates on a point-to-point 1200/600, 2000, 2400, and 4800 bps. See M2700 pages for information on communications facilities. The 5120 Computing System may also operate as a tributary station residing on a multipoint (leased or private) communications line as a compatible member of the IBM family of BSC terminals in conjunction with a S/370, 303X, or 4300 Processor control station at transmission rates of 1200 to 4800 bps. This feature will operate in half-duplex mode over dial (switched network) facilities, and in half-duplex mode over leased (or equivalent private) communications lines which may be half or full-duplex facilities. Operation of this feature on the 5110 mdl 3 will be overlapped with printer operation at all rates including 4800 bps. BSC units at each termination of a data link to which the 5120

5110 Computer Mdl 3 (cont'd)

Computing System is attached must be set to operate at the same transmission rate and to use the same transmission code.

This feature supports, as a basic capability, the transmission and reception of blocked records. Switched network versions include the support of Manual Dial and Manual or Auto-Answer (where the attached modem supports this capability). The feature may be configured to operate with the EBCDIC transmission code or EBCDIC transparency code. The Internal Clock will generate synchronizing and timing signals for BSCA operation when they are not provided by the attached modem. The decision to use, or not use, the internal clock is made at configuration time. When the internal clock is used, all other terminals attached to the same data link must also be equipped with similar internal clocking capability. Transmission rates of 600 or 1200 bps are selectable at configuration time and initialization time. One of the IBM modems, 3863 (2400 bps), 3872 (2400 bps), or 3864 (4800 bps) may be attached to the BSCA (#2074) of the 5110 mdl 3. For more information on the capabilities of these modems refer to M3863 and 3864 pages. Communications facilities attachments for the 5110 mdl 3 BSCA are designed to operate on transmission facilities such as:

- Common Carrier leased telephone line services (voice grade), (Canada only+ AT&T or Western Union Class 3002 (to 4800 bps) +).
- Voice Grade nonswitched (PTT or private) lines supporting a 4800 bps transmission rate. Channel requirements may vary according to the type of data set selected. The data set manufacturer should be consulted by the customer for this information.
- Voice Grade switched PTT network telephone service at 600, 1200, 2400, or 4800 bps.
- Private (customer-owned) communications facilities equivalent to the above common carrier facilities.

See M2700 pages for additional information concerning modems, communications facilities, machine attachment requirements, terminal intermix, operating capabilities and customer responsibilities.

Supported Configurations:

- Leased point-to-point, switched point-to-point, multipoint tributary
- Internal clock, modem clock

(Canada only+)

- EIA RS-232-C Interface +)

(Except Canada+)

- CCITT V.24/V.28 Interface +)
- Full-speed, half-speed line rate
- Full-duplex, half-duplex
- Use Switched Network Backup (SNBU), no SNBU
- Use 202 mode - Yes/No
- Use Auto-Answer - Yes/No
- Transparency Mode - Yes/No
- Error Threshold (1:18, 1:14, 1:2, 2:1, 4:1, 8:1)
- Transmit/Receive
- Protocol Emulation 2770/3741
- Blank Truncation - Yes/No
- ENQ maximum count
- NAK maximum count
- 5110 Inactive timer
- Line Hold Timer (default 20 seconds)
- Record Length
- Poll ID
- Select ID
- Local ID
- Remote ID
- Space Compression Expansion - Yes/No
- Punch Device Number (DC1/DC2/DC3)
- Read/Write with Hold - Yes/No
- Connect dataset to line - Yes/No
- Send answer tone - Yes/No
- Online Test - Yes/No
- Calling Station - Yes/No
- Write Unblocked - Yes/No

Modem and Data Set interface to the BSCA (#2074) feature are:

(Except Canada+)

Facility	Speed	Service	Type of Modem
C2	1200	Switched	Stand-alone
C3	2400	Switched	Stand-alone
D5	2400	Nonswitched	Stand-alone
D6	2800	Nonswitched	Stand-alone
K3	2400	Switched	Stand-alone+)

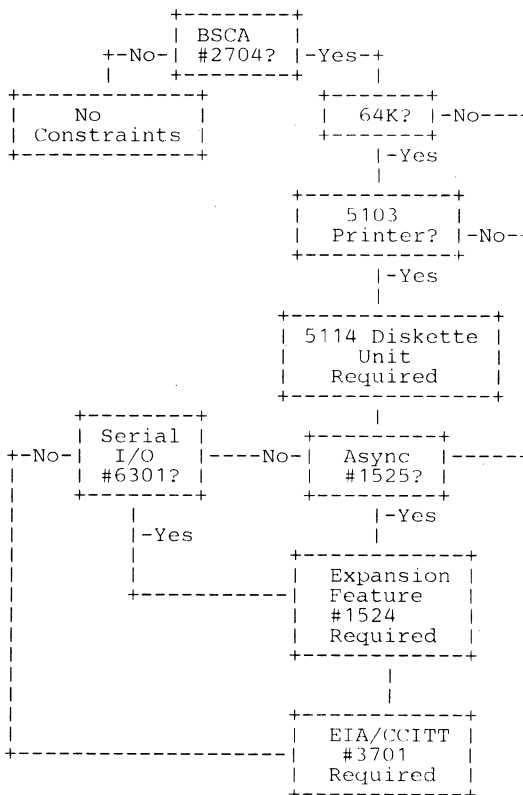
(Canada only+)

Facility	Speed	Service	Modem
C4M	1200/600	Switched	Stand-alone
C5	2400	Switched	3863
C5	2400	Switched	3872
C5M	2000/2400	Switched	Stand-alone
C6	4800	Switched	3864
C6M	4800	Switched	Stand-alone
D3M	1200/600	Nonswitched	Stand-alone
D4	2400	Nonswitched	3863, 3868-1
D4	2400	Nonswitched	3872
D4M	2000/2400	Nonswitched	Stand-alone
D4SB	2400/1200	Nonswitched	3872
D5	4800	Nonswitched	3864, 3868-2
D5M	4800	Nonswitched	Stand-alone
X1M	2400	Private	Stand-alone
X2M	4800	Private	Stand-alone+)

Limitations: See "5120 Computing System Configuration Considerations". **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** In addition to the basic functions of Binary Synchronous Communications, #3701 must be added.

EIA/CCITT Interface (#3701): Provides a cable and interface for the attachment of an IBM or non-IBM modem or PTT mandatory service meeting (Canada only+ EIA RS-232-C +)(Except Canada+ CCITT V.24/V.28 +) characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074. (Japan only+ Specify: #2946 for attaching a non-IBM modem. This is to satisfy the NTT's DTE self-test requirement. +)

5120 Computing System Configuration: Most configurations of I/O and optional features are possible, but due to power and packaging considerations, some configurations are not available. If BSCA is installed, the following options and constraints apply:



If BSCA (#2074) is used in conjunction with APL, a 32K minimum 5110 mdl 3 is required. If a 5103 printer is attached to the 5110 mdls A34, B34, or C34, a 5114 Diskette Unit is required.

5110 Computer Mdl 3 (cont'd)**MODEL CONVERSIONS**

Conversions of model 3 are field installable. Field conversion to the combination model (A to C, B to C) is permitted. Model conversion from a 5110 model 1 or 2 to a model 3 are not permitted.

The upgrade purchase price for conversions may be greater than the original purchase price of a larger model. The customer should carefully evaluate future requirements prior to purchasing a system.

Replaced parts from any model conversion become the property of IBM.

ACCESSORIES

Cables: Cables to attach peripheral devices to the 5110 via the Parallel I/O Adapter may be purchased from IBM or from a customer-selected source. See *5110 General Information and Physical Planning Manual* (GA21-9300), for cable and connector specifications. Assembled cables 2 meters (6.5 feet) long may be purchased from IBM. Order on MES from Rochester plant, A/N **4836338**. **Note:** Maximum interconnecting device cabling as specified in IEEE 488-1975 standard is 20 meters (65 feet).

SUPPLIES

Diskettes: Preinitialized diskettes for the 5110 mdl 3 are available in packages of ten from IBM.

5140 PC CONVERTIBLE ENHANCED LIQUID CRYSTAL DISPLAY (LCD)

PURPOSE

The 5140 PC Convertible Enhanced (LCD), 256Kb Memory Card, Enhanced Internal Modem, and Monochrome Display Model 002 (240V); PC Convertible support for the 3852 Model 002 Colorjet Printer and 6180 Model 001 and 7372 Color Plotters.

The Enhanced LCD provides improved readability through increased contrast, greater viewing angle and better glare control. The 5140 PC Convertible 256Kb Memory Card allows the PC Convertible to be expanded to 640Kb of memory. It is the same physical size as the PC Convertible 128Kb Memory Card. The Enhanced Internal Modem supports both the IBM Command Set and the Attention Command Set.

MODELS

Model 002 (Standard): Contains System Unit/Keyboard/LCD Display, 256Kb Memory, two 720Kb Diskette Drives, battery pack, AC adapter, GTO with System Profile, Diagnostics, Software Set-up and Application Selector.

Model 022 (Base): Contains System Unit/Keyboard/LCD Display, 256Kb Memory, two 720Kb Diskette Drives, battery pack, AC adapter, GTO with diagnostics and System Profile.

Model 003: Has Backlit Display and 256Kb CMOS Memory. The IBM PC Convertible Model 003 is powered by either its own battery or an AC power source. The PC Convertible Model 003 differs from Models 002 and 022 in that it comes with a Backlit LCD.

Limitations: Currently Supported Options:

- 3708 Network Control Unit
- 3710 8-Port Communication Adapter
- 4201 Proprinter
- 4202 Proprinter XL Model 1
- 4863 PCjr Color Display
- 5152 Graphics Printer
- 3852 Model 002 Colorjet Printer
- 6180 Model 001 Color Plotter
- 7372 Color Plotter
- 5153 PC Color Display
- 5841 Modem (1200 bps)
- IBM Communications Adapter Cable (#2067)
- IBM PC Printer Cable (#5612)
- PCjr Adapter Cable for the IBM Color Display (#0021)
- PCjr Connector for TV (#0020)
- Backlit LCD Option Kit (P/N 2682799)

All IBM Personal Computer, IBM PCjr, IBM Personal Computer XT, IBM Personal Computer AT, or IBM Portable Personal Computer options, adapters, and devices not specifically listed above as supported, have not been tested on the 5140 system and are not supported.

Prerequisites: The user must have IBM Personal Computer Disk Operating System (DOS), Version 3.2 or 3.3 to operate the 5140 properly. Previous DOS versions are not supported. In addition, each application program has its own prerequisites in terms of memory and I/O requirements.

The PC Convertible CRT Display Adapter (#4020) requires that the system unit be operated from power supplied by the AC adapter. Color displays, video monitors or television sets supported via #4020 require their own AC power source. When the "SystemApps" coexist with other application programs, more memory than the 256Kb may be required. Since these functions require displays with 80 column formats, they are not supported with CRT displays or television sets which have 40 column formats.

Customer Setup (CSU): Yes. CSU allowance is one day.

HIGHLIGHTS

- Designed to provide the user with computing capability at the point of need
- Full portability has been achieved by selection of key technologies which use a minimum of power and require a minimum of space
- Expandable with additional memory, printer, and other I/O devices

Compatibility: Through the use of the IBM Personal Computer 3.5 inch External Disk Drive, data may be transferred between the 5140 system unit and the IBM Personal Computer, IBM Personal Computer XT, IBM Portable Personal Computer, and IBM Personal Computer AT.

Security/Integrity: The user, and/or user management, is responsible for evaluation, selection, and implementation of security features, establishment of administrative procedures, and for appropriate controls in application systems.

If sensitive data is to be sent over external communication facilities, user management may wish to pursue the application of cryptography.

Performance Considerations: The 5140 system unit performance depends upon the number and types of devices attached to the system, the operating characteristics selected for those devices, and the types of application programs being used. Communications over external lines can be accomplished at speeds up to 1200 bps.

Battery life depends on the temperature, amount of memory installed in the system unit, usage of the input/output devices (keyboard, diskette drives, printer, internal modem, etc.), and whether the LCD and system are set to automatically power off during periods of inactivity.

Performance testing has indicated that the 5140 system unit provides satisfactory throughput and response times for an entry level system.

DESCRIPTION

5140 System Unit/Keyboard/Liquid Crystal Display

- 4.77 MHz clock speed
- 20-bit addressing (low 8 bits address multiplexed with data)
- 8-bit data path
- 64Kb ROM
- 12 watt power supply; 16.5 watt (Model 003)
- Dimensions:
 - Depth: 360mm (14.17 in.); 374mm (14.72 in.) including handle
 - Width: 309.6mm (12.19 in.); 312mm (12.28 in.) including handle
 - Height: 67mm (2.64 in.), plus 1mm (0.04 in.) foot pads
 - Weight: 5.5 kg (12.17 lbs.).
- Standard and Base models (including battery)
- Electrical - (AC Adapter input range): 90-265V AC, 50/60 Hz
- Air Temperature excluding 5144 Monochrome Display, 5145 Color Display, Printer (#4010), ribbon and paper:
 - System on: 10.0 degrees to 40.6 degrees C (50 degrees to 105 degrees F)
 - System off: 0.6 degrees to 51.7 degrees C (33 degrees to 125 degrees F)
 - Shipping: -40.0 degrees to 60.0 degrees C (-40 degrees to 140 degrees F)
- Humidity, excluding 5144 Monochrome Display, 5145 Color Display, Printer (#4010), ribbon and paper, non-condensing:
 - System on: 5 - 95% RH

- System off: 5 - 95% RH
- Temperature range for 5144 Monochrome Display and 5145 Color Display:
 - Operating: 10.0 degrees to 40.6 degrees C (50 degrees to 105 degrees F)
 - Non-operating: 10.0 degrees to 52.0 degrees C (50 degrees to 125 degrees F)
 - Shipment: -40.0 degrees to 60.0 degrees C (-40 degrees to 140 degrees F)
- Humidity range for 5144 Monochrome Display and 5145 Color Display:
 - Operating: 8 - 80%
 - Non-operating: 8 - 80%
 - Storage and shipment: 5 - 100% (excluding rain and condensation)
- Temperature range for Printer (#4010) with ribbon:
 - Operating: 10.0 degrees to 35.0 degrees C (50 degrees to 95 degrees F)
 - Non-operating: 5.0 degrees to 35.0 degrees C (35 degrees to 95 degrees F)
- Temperature range for Printer (#4010) without ribbon:
 - Operating: 10.0 degrees to 35.0 degrees C (50 degrees to 95 degrees F)
 - Non-operating: -28.9 degrees to 45.0 degrees C (-20 degrees to 113 degrees F)
- Humidity range for Printer (#4010) with ribbon:
 - Operating: 45 - 85%
 - Non-operating: 45 - 85%
 - Shipment: 45 - 85% (excluding rain and condensation)
- Humidity range for Printer (#4010) without ribbon:
 - Operating: 5 - 95% (5 - 85% for thermal paper)
 - Non-operating: 5 - 95% (5 - 85% for thermal paper)
 - Shipment: 5 - 95% (excluding rain and condensation)
- FCC Class: B

Standard Features: The following major functional components are supplied as standard with the 5140:

- CMOS 80C88 microprocessor
- Two 32Kb CMOS ROMs including:
 - Power-on self test of system components
 - Basic input/output system (BIOS) support
 - BASIC language interpreter
- 256Kb CMOS RAM
- Two 3.5 inch 720Kb (formatted) Diskette Drives
- 80 column x 25 line detachable Liquid Crystal Display (LCD) panel (graphics modes: 640 x 200 resolution and 320 x 200 resolution)
- LCD Controller
- 16Kb RAM Display Buffer
- 8Kb LCD font RAM
- 78-key keyboard
- Time-of-day module (clock)
- IBM PC Convertible Printer Interface
- DC power supply (battery or AC adapter powered)
- Built-in speaker
- 72-pin I/O feature connector
- 8-level interrupt
- 3 Direct Memory Access (DMA) channels
- 2 Programmable timers

Physical Specifications:

Width - 309.6mm (12.19 in.); 312mm (12.28 in.) including handle
 Depth - 360mm (14.17 in.); 374mm (14.72 in.) including handle
 Height - 67mm (2.64 in.), plus 1mm (0.04 in.) foot pads
 Weight - 5.57kg (12.32 lbs.)

Operating Environment:

- Any model of the system is functional when taken directly from the shipping carton, after following the setup instructions.
- Use of the system immediately after unpacking is possible by installation of the battery pack and use of the AC adapter, powered from a suitable AC power source. The use of the system on battery power requires the charging of the battery pack in the system unit by using the AC adapter or battery charger for a minimum of 24 hours before initial use.

- System power must be derived from an AC power source when using the PC Convertible CRT Display Adapter (#4020). When a separate CRT monitor (such as either of the optional 5144 Monochrome Display or 5145 Color Display) or a television set is attached, it will require its own AC power source.

Software Requirements

IBM Personal Computer Disk Operating System (DOS) Version 3.2.

Optional Software Supported: IBM announces the following software on 3.5 inch media to support the 5140 and the IBM 3.5 inch External Diskette Drive:

Program	Part Number	Feature Code
DOS/Basic		
Interpreter 3.2	6280058	0058
Macro Assembler	6280077	0077
Basic Compiler	6280078	0078
C Compiler	6280081	0081
DisplayWrite 3	6489766	9766
Miniframe		
Communications Assistant	6024452	4452

IBM Accounting Assistant Series

Program	Part Number	Feature Code
General Accounting Edition	6467003	9714
Accounts Payable Edition	6467004	9715
Accounts Receivable and Billing Edition	6467005	9716
Payroll Edition	6467006	9717
Inventory Control and Purchasing Edition	6467007	9718
Job Cost Edition	6467008	9719

Personal Decision Series

Program	Part Number	Feature Code
Data Edition	6466983	9625
Reports+ Edition	6466984	9626
Words Edition	6466985	9627
Plans Edition	6466986	9628
Plans+ Edition	6466987	9629
Graphs Edition	6403821	3821

IBM supports most of the modules of the IBM Assistant Series on 3.5 inch diskette.

The 5140 is supported by the PROFS Personal Computer Support feature via ASCII attachment. The user is responsible for loading the feature code onto 3.5 inch media and must use the PROFS PC Support "AUTOLOG" option for telephone dialing when using the PC Convertible Internal Modem (#4025).

IBM announces the following software on 5.25 inch media to support the 5140. The user may load this software on 3.5 inch diskette within the terms and conditions of the IBM Licensing Agreement.

Program	Part Number	Feature Code
IBM 3103 Emulation Program	6024042	4042
Asynchronous		

Communications Support	6024032	4032
IBM Planning Assistance Solutions	6024135	4135
IBM Assistant Home Solutions	6024150	4150
IBM Executive Solutions	6024151	4151
IBM Accounting Solutions	6024152	4152

In addition, the following independent software publishers have informed IBM that they intend to support the program listed below on the 5140 and IBM 3.5 Inch External Disk Drive.

Software Publisher	Program
Alpha Software Corporation	Electric Desk (TM)* Data Base Manager II -The Integrator (TM) dBase III Plus (TM) Framework II (TM)
Ashton-Tate	
Computer Associates International, Inc.	EasyWriter II (TM) SuperCalc 3 (R) SuperProject (TM)
Lifetree Software, Inc.	Volkswriter 3 (R)
Living Videotext, Inc.	ThinkTank (TM) Ready! (TM)
Lotus Development Corporation	1-2-3 (TM) Symphony (TM)
Micro Education Corporation of America	Managing Your Money (TM)
MicroPro International Corporation	WordStar (R) WordStar (R) Professional WordStar (R) 2000 WordStar (R) 2000 Plus
Microrim, Inc.	R: BASE (R) 5000 Clout (R) with FileGateway R: BASE (R) 4000 Extended Report Writer
Microsoft Corporation	Microsoft (R) Chart Microsoft (R) Flight Simulator Microsoft (R) Multiplan Microsoft (R) Project Microsoft (R) WORD Crosstalk (TM) XVI
Microstuf, Inc. Multimate International Corporation	MultiMate (TM)
Satellite Software	

International Scarborough Systems, Inc.	WordPerfect (TM)
TCS Software, Inc.	Master Type (TM) TCS Client Ledger System (TM)
Timberline Systems, Inc.	Timberline (R) Architects/Engineers Timberline(R) Series: Estimating I General Ledger Job Cost Starter Set
Tronix Publishing, Inc.	Dollars and Sense (TM)

* Electric Desk is a trademark licensed to Alpha Software Corporation by Electric Software, Inc.

Customer Responsibilities:

1. The customer is responsible for unpacking and setting up the system and system components and/or options, devices, and accessories for the 5140 per the setup instructions provided. Additionally, the customer is responsible for unpacking the battery pack, installing it into the system unit using the instructions provided, and charging it in the system unit by using the AC adapter or battery charger, for a minimum of 24 hours before the initial use of the system on battery power. Note: The 5140 system may be used immediately with the AC adapter.
2. The customer should be aware of temperature and humidity specifications and should exercise reasonable care in handling and transportation of the product and media.

Publications: The 5140 is shipped with one Guide To Operations (GTO) (#4075 for mdl 002 and #4076 for mdl 022). A Start-up diskette is packaged with the GTO #4075. This diskette contains system software, diagnostics, and "Exploring the IBM PC Convertible", an online familiarization program. A Diagnostics-only diskette is packaged with the GTO #4076.

- Guide To Operations (GTO) (#4075): The GTO is intended for both experienced and inexperienced computer users. It summarizes the capabilities of the 5140 and contains operational information for the hardware, including options. In addition, the GTO contains step-by-step instructions for using the software and problem determination procedures. Printer and modem control codes are included, as well as system messages. It may be used to obtain software for a Base mdl 022.
- Guide To Operations - Hardware Edition (#4076): The GTO is intended for both experienced and inexperienced computer users. It summarizes the capabilities of the 5140 and contains operational information for the hardware, including options. In addition, the GTO contains step-by-step instructions for using the problem determination procedures. Printer and modem control codes are included, as well as system messages.
- Technical Reference (#4080): The Technical Reference manual is intended for hardware and software designers, programmers, engineers, and others who need to understand the design and operation of the 5140. These readers should be familiar with the use of the 5140 and understand computer architecture and programming concepts. The Technical Reference consists of two volumes. Volume 1 describes the hardware design and the system interface and contains information about the basic input/output system (BIOS) and programming support. Volume 2 contains the BIOS listings.
- Hardware Maintenance and Service (#4085): The Hardware Maintenance and Service manual is intended for trained service personnel who understand how to use the 5140. This manual provides operational instructions and hardware information required to locate a failing part and make the necessary repair. This manual also contains error code charts and a parts catalog. An Advanced Diagnostics diskette is packaged with this manual.

SPECIFY (NONE)
SPECIAL FEATURES

PC Convertible 128Kb Memory Card (#4005) and 256Kb Memory Card (#6030): This option expands the base memory of both models of system units. 128Kb Memory Cards can be installed in each model until a maximum 640Kb is installed. Field Installation: Yes. Customer Setup: Yes.

PC Convertible Printer (#4010): The PC Convertible Printer is an option designed to attach to the back of the system unit, or an optional printer attachment cable may be used for adjacent printer operation. It is an intelligent microprocessor-based, 40 cps (burst rate) serial non-impact dot matrix design capable of low power operation. It draws its power and control from the host system.

Standard ASCII 96-character, uppercase and lowercase character sets are printed using a high resolution 24 element print head. An all-points-addressable (APA) print mode for graphics is also provided. "Near Letter Quality" printing can be accomplished using either a thermal transfer ribbon on "smooth" (60 Sheffield units, maximum) paper, or no ribbon on heat-sensitive thermal paper. Draft-quality printing may be achieved using the thermal transfer ribbon on IBM Multi-System Paper, P/N 7034548 or equivalent. Field Installation: Yes. Customer Setup: Yes.

PC Convertible Serial/Parallel Adapter (#4015): The PC Convertible Serial/Parallel Adapter is an option that attaches to the back of the system unit, PC Convertible Printer (#4010), or another option attached to the back of the system unit. The adapter provides an RS-232-C asynchronous communications interface and a parallel printer interface which are compatible with the PC Asynchronous Communications Adapter and the PC Parallel Printer Adapter. Field Installation: Yes. Customer Setup: Yes.

PC Convertible CRT Display Adapter (#4020): The PC Convertible CRT Display Adapter is an option that attaches to the back of the system unit, PC Convertible Printer (#4010), or another option attached to the back of the system unit. It allows the user the capability of connecting a separate CRT display to the system. The optional 5144 Monochrome Display and 5145 Color Display may be connected by using this adapter. Through the use of optional connectors or cables (existing item) it also allows the attachment of the IBM PCjr Color Display, IBM Color Display, or a standard television set (US only). Field Installation: Yes. Customer Setup: Yes.

PC Convertible Internal Modem (#4025): The PC Convertible Internal Modem allows the user the capability of communication between the system and other compatible units/systems over existing telephone lines. It is designed for US and Canada use only. It uses modulation methods and frequency tolerances equivalent to either Bell 212A (1200 bps) in high speed mode or Bell 103A (300 bps) in low speed mode. The option will be offered as a complete assembly consisting of two cards connected by a cable, the entire assembly being installed in the system unit. Field Installation: Yes. Customer Setup: Yes. (Dealer or IBM installation recommended.)

PC Convertible Enhanced Internal Modem (#4026): The Enhanced Internal Modem allows the user to communicate between the IBM PC Convertible and compatible units/systems over existing telephone lines. It is designed for US and Canada use only. It uses modulation methods and frequency tolerances equivalent to either Bell 212A or Bell 103A. The Modem supports both the IBM and Attention command sets. It is capable of running applications designed for either IBM or Hayes compatible modems. Field Installation: Yes. Customer Setup: Yes (Dealer or IBM installation recommended).

PC Convertible Printer Cable (#4055): The PC Convertible Printer Cable is a cabling accessory 0.6m (22 inches) in length with a custom 72-pin system-type connector attached to each end. It allows the user the capability of operating the printer immediately adjacent to (i.e., physically detached from) the system unit, to provide flexibility of placement for ease of use and visibility. Field Installation: Yes. Customer Setup: Yes.

PC Convertible Battery Charger (#4060): The PC Convertible Battery Charger is a small 110V input option designed to be used to charge the internal batteries of the system unit. It does not provide sufficient power output to allow system operation while the batteries are being charged. Field Installation: Yes. Customer Setup: Yes.

PC Convertible Automobile Power Adapter (#4065): The PC Convertible Automobile Power Adapter is designed to power the system unit while simultaneously charging the internal batteries of the system unit. The Adapter attaches to the system unit and plugs into the cigarette lighter outlet in a vehicle with a 12V negative-ground electrical system. Field Installation: Yes. Customer Setup: Yes.

Standard Carrying Case (#4090): The 5140 PC Convertible Standard carrying case is intended to enhance the portability of the 5140 and all its accessories. This case is designed for the professional user in any business or personal application requiring transport of the 5140.

Highlights:

- Holds system unit, printer, auto adapter, acoustic adapter, battery charger, printer or display adapter, and supplies
- Meets carry-on requirements of commercial airlines
- System unit and printer can be operated while inside case
- Ribbed material on outside of bag provides additional system protection
- Removable shoulder strap
- Internal pockets for diskettes and Guide to Operations
- External pockets for easy accessibility to accessories
- Water repellent/stain resistant

Physical Characteristics:

- Dimensions: 20.5 in. wide x 13.25 in. high x 4 in. deep
- Weight: 4.2 lbs.
- Color: Slate gray
- Fabric: 1000 denier heavy weave nylon with EVA panels

Contents:

- One carrying case with shoulder strap

Compact Carrying Case (#4095): The 5140 PC Convertible Compact carrying case is a small, lightweight case for the system unit. This is particularly useful where only the system unit will be carried, either with or without the printer. The case is styled appropriately for use in business or on a school campus.

Highlights:

- Holds system unit only in the main compartment to meet minimal size requirement.
- Meets carry-on requirements of commercial airlines
- Expandable pocket holds printer and/or paper and notebooks
- Removable shoulder strap
- Shoulder strap converts to back pack strap
- Water repellent/stain resistant

Physical Characteristics:

- Dimensions: 13.0 in. wide x 16.0 in. high x 3.5 in. deep
- Weight: 2.4 lbs.
- Color: Slate gray
- Fabric: 420 denier nylon

Contents:

- One carrying case with shoulder strap

PC Convertible Enhanced Display (#6010): The PC Convertible Enhanced LCD provides increased contrast for improved readability and viewing angle by using "supertwist" LCD technology. There is an analog contrast switch located on the front display cover. Better glare control is achieved by using etched glass as the outer screen surface. There is no impact on battery life. It fits into the same LCD assembly on the Convertible as the present screen. Field Installation: Yes. Customer Setup: Yes.

Backlit LCD Option Kit (P/N 2682799): The IBM PC Convertible Backlit LCD has internal illumination, which means it can be used

in low light conditions. Battery life is dependent on the setting of the brightness control. The Backlit LCD will work on all Convertible models by plugging it into the LCD assembly in place of the current screen and putting in the new power supply. A new power supply is packaged with the Backlit LCD option.

The Backlit LCD itself is a monochrome display consisting of 640 X 200 addressable pels. Illumination is provided by an Electro-Luminescent (EL) backlit panel. It is a transmissive type LCD. It is intended to be operated with the panel light on at all times. A slide type control is provided to allow adjustment of light level.

- PCC Model 003 has Backlit Display and 256Kb CMOS Memory.
- Backlit LCD - Used with either Model 002 or 022 (new power supply shipped with the Backlit Option is required)

MODEL CONVERSIONS (NONE)**ACCESSORIES (NONE)****MACHINE ELEMENTS (NONE)****SUPPLIES**

IBM PC Convertible Printer Ribbons (P/N 2682958): The PC Convertible Printer Ribbon is a thermal transfer mini-cassette ribbon for use with the IBM PC Convertible Printer. The shelf life of this ribbon is two years and is available in black ink. The average yield of this ribbon is 26,000 characters.

Thermal Paper (P/Ns 1503923 and 1503924): Thermal paper is available on continuous rolls (8-1/2 in. by 89 ft) as an existing item packaged two rolls per carton under P/N 1503923. Thermal cut-sheet paper (8-1/2 in. by 11 in.) is also available as an existing item in packages of 250 sheets under P/N 1503924.

5144 PC CONVERTIBLE MONOCHROME DISPLAY**PURPOSE**

The 5144 PC Convertible Monochrome Display is a 9-inch (measured diagonally) composite video display which provides for the display of alphanumeric output and graphics in monochrome (green) phosphor.

MODELS**Model 001**

(Except Canada > Model 002: (240V; 208-259 vac range; 50/60 Hz) Functionally equivalent to the 5144 model 001. Model 002 can be used where convertibility to a desk-top environment is desired. <)

Prerequisites: The 5140 PC Convertible CRT Display Adapter (#4020) is required for attachment of the 5144.

Customer Setup (CSU): Yes. CSU allowance is one day. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

HIGHLIGHTS

- Display stand, an AC power cord, and a signal cable which connects the 5144 to the 5140 PC Convertible CRT Display Adapter (#4020) are provided with the display.
- Compatible with composite video output of #4020
- Text modes:
 - 80 x 25
 - 40 x 25
- Graphics modes:
 - 640 x 200
 - 320 x 200
- 160mm wide by 120mm high usable image area
- P31 (green) phosphor

- Direct-etched screen
- Removable high contrast filter
- Operator controls:
 - ON/OFF power switch
 - Brightness control
 - Contrast control
- AC powered

Hardware Requirements

- The 5144 is functional when taken directly from the shipping carton, after following the setup instructions, including connection to a suitable AC power source.
- Use of the 5144 with the 5140 PC Convertible system unit requires the 5140 PC Convertible CRT Display Adapter (#4020).
- System power must be derived from an AC power source when using the 5145 PC Convertible Color Display.

Customer Responsibilities: The customer is responsible for unpacking and setting up the 5144 per the installation instructions provided.

SPECIFY (NONE)**SPECIAL FEATURES (NONE)****MODEL CONVERSIONS (NONE)****ACCESSORIES (NONE)****SUPPLIES (NONE)**

5145 PC CONVERTIBLE COLOR DISPLAY

PURPOSE

The 5145 PC Convertible Color Display is a 13-inch (measured diagonally) color display which provides for the display of alphanumeric and graphics data in medium resolution - 320 x 200 lines - color. It is designed for those customers whose application requirements will be satisfied by that resolution.

MODELS

Model 001

Limitations: The IBM PC Convertible Color Display will display business and graphics data in 40 X 25 character mode. In 80 X 25 character mode, it can be used for word processing and text applications although its resolution is less than that of the 5153 Color Display.

Prerequisites: The IBM PC Convertible CRT Display Adapter (#4020) is required for attachment of the 5145.

Customer Setup (CSU): Yes. CSU allowance is one day. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

HIGHLIGHTS

- Display stand, an AC power cord, and a signal cable which connects the 5145 to the IBM PC Convertible CRT Display Adapter (#4020), are provided with the display.
- Compatible with RGBI digital output of #4020
- Text mode:
 - 40 x 25
 - IBM PC compatible colors
- Graphics mode:
 - 320 x 200
 - IBM PC compatible colors
- 256mm wide by 176mm high usable image area
- Direct-etched, high contrast screen
- 0.63mm pitch, slot-type shadow mask
- Audio capability:
 - Built-in speaker
 - Earphone jack
- Operator controls:
 - ON/OFF power switch
 - Brightness control
 - Contrast control
 - Audio volume control
- AC powered

Hardware Requirements

- The 5145 is functional when taken directly from the shipping carton, after following the setup instructions, including connection to a suitable AC power source.
- Use the 5145 with the 5140 PC Convertible system unit requires the IBM PC Convertible CRT Display Adapter (#4020).
- System power must be derived from an AC power source.

Customer Responsibilities: The customer is responsible for unpacking and setting up the 5144 per the installation instructions provided.

Warranty: One year.

Warranty Service: Customer Carry-In Exchange (CCE) warranty service is provided. Warranty service offerings are described in the "Agreement for Purchase of IBM Machines", Z120-2892 and the "Amendment for IBM Service/Exchange Center Services", Z125-3385.

Maintenance Service: Maintenance service is available under the "IBM Maintenance Agreement (MMC)", Z125-3275 and the "Amendment for IBM Service/Exchange Center Services", Z125-3385. The following services, as described in the "Information Bulletin For Customers - IBM Service/Exchange Center Services and Associated On-Site Services", G125-3488 are available:

- IBM On-Site Exchange (IOE)
- Customer On-Site Exchange (COE)
- Customer Carry-In Exchange (CCE)

Volume maintenance is available to qualifying customers under the "Volume Maintenance Amendment to IBM Maintenance Agreement", Z125-3777. Volume maintenance customers which select an IBM On-Site Warranty Option may have initial setup of machines included under the VMA, performed by IBM at no charge.

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5150 PERSONAL COMPUTER

PURPOSE

The 5150 Personal Computer is a low-cost system that provides computing capability in a small package. A variety of operating systems and programming languages is supported. Software is available to allow stand-alone use for applications such as professional decision-making support, word processing, computer-based training, business accounting, and home entertainment. The 5150 Personal Computer may also be used as an intelligent workstation, connected to a wide variety of IBM data processing and office automation systems. Such connection allows the 5150 user to take advantage of the additional computing power, communications, mass storage, high-speed printing, application software, and data bases provided by the host system.

MODELS

Model 104 (NO LONGER AVAILABLE): System Unit/Keyboard, 64Kb Memory.

Model 166 (NO LONGER AVAILABLE): System Unit/Keyboard, 256Kb Memory, 5-1/4 Inch Diskette Drive Adapter, one 5-1/4 Inch Double-Sided Diskette Drive.

Model 176 (NO LONGER AVAILABLE): System Unit/Keyboard, 256Kb Memory, 5-1/4 Inch Diskette Drive Adapter, two 5-1/4 Inch Double-Sided Diskette Drives.

Model 174: System Unit/Keyboard, 64Kb Memory, 5-1/4 Inch Diskette Drive Adapter, two 5-1/4 Inch Double-Sided Diskette Drives.

Model X14: System Unit, 64Kb Memory, 5-1/4 Inch Diskette Drive Adapter, one 5-1/4 Inch Single-Sided Diskette Drive. For use with the 3270 Personal Computer Attachment.

Model X64: System Unit, 64Kb Memory, 5-1/4 Inch Diskette Drive Adapter, one 5-1/4 Inch Double-Sided Diskette Drive. For use with the 3270 Personal Computer Attachment.

Model X74: System Unit, 64Kb Memory, 5-1/4 Inch Diskette Drive Adapter, two 5-1/4 Inch Double-Sided Diskette Drives. For use with the 3270 Personal Computer Attachment.

Prerequisites: For mdl's 104, 114, 164, 174: Attachment of one of the following display options:

- A 5151 Monochrome Display mdl 001 and either the Monochrome Display and Printer Adapter (#4900) or Enhanced Graphics Adapter (#1200).
- A 5153 Color Display mdl 001 and the Color/Graphics Monitor Adapter (#4910).
- A 5154 Enhanced Graphics Display mdl 001 and the Enhanced Graphics Adapter (#1200).
- A user-supplied direct-drive color or black and white video monitor, or a user-supplied color or black and white television set with an RF modulator, and the Color/Graphics Monitor Adapter (#4910).

Customer Setup (CSU): All mdl's and special features of the 5150 Personal Computer are customer setup.

HIGHLIGHTS

- The System Unit is the heart of the 5150 Personal Computer. This table-top unit houses the high-performance microprocessor, up to two 5-1/4 Inch diskette drives, 40Kb of read-only memory (ROM), up to 640Kb of random access memory for user programs, five system expansion slots, attachment for a customer-supplied cassette recorder, a

speaker which can be programmed to produce tones, and a power supply. The system can be further expanded through options that provide additional configuration flexibility.

- The following features are supplied as standard with the 5150 Personal Computer System Unit:

- 83-key keyboard
- Five system expansion slots (one slot is required for a display adapter; one additional slot is used for the 5-1/4 Inch Diskette Drive Adapter (#3780) if required).
- Intel 8088 Microprocessor
 - 4.77M Hz clock speed
 - 410ns cycle time
- 64Kb random access memory
 - Parity checking
 - 250ns memory access time
- 40Kb read-only memory
 - Enhanced version of BASIC-80 Interpreter (cassette level)
 - Built-in power-on diagnostic self-test
- On mdl's 166 and 176, 5-1/4 Inch Diskette Drive(s) and adapter
 - One double-sided drive standard on mdl 166
 - Two double-sided drives standard on mdl 176
- (Canada only > 130<) watt power supply with cooling fan
- Attachment for a user-supplied cassette recorder for loading or saving programs or data
- Programmable speaker which can be used to produce tones

- Dimensions (approximate):

Height - 142mm (6 in.)
 Width - 500mm (20 in.)
 Depth - 410mm (16 in.)
 Weight - 9.5kg (21 lbs) (without diskette drives or adapter)

- Some of the options available for the 5150 Personal Computer include:

- Attachment of the 5161 Expansion Unit mdl 001 provides:
 - ▲ 10Mb Fixed Disk Drive for increased storage capacity
 - ▲ Additional configuration flexibility
 - ▲ 5151 Monochrome Display mdl 001
 - ▲ 5153 Color Display mdl 001
 - ▲ 5154 Enhanced Graphics Display mdl 001

- Highlights of the BASIC-80 Interpreter include:

- Full screen editor for easy program creation and modification
- Select 40- or 80-character display lines
- Up to 16 foreground and 8 background colors (with appropriate monitor and adapter)
- Automatic line numbering
- 40-character variable names (all characters significant)
- Multiple statements per program line
- 250 characters per program line
- Comments on program lines
- Up to 17-digit numeric precision
- Supports sequential cassette files
- Error trapping
- Addressable workspace up to 60Kb
- Integer/real/string variables
- Single- and double-precision floating point numbers

- When turned on, the 5150 automatically runs a power-on self-test to verify system readiness. If the validation is successfully completed, the BASIC ROM Interpreter (cassette level) is made ready and identified on the display screen. The user may now enter a program from the keyboard or load it from a cassette recorder. If a failure is found, an identifying number will appear on the screen. If a diskette drive is in-

stalled, the 5150 automatically loads from the diskette in drive "A". This is typically the Disk Operating System (DOS) or an application program. The DOS may in turn invoke the Disk or Advanced levels of BASIC, followed then by the manual or automatic execution of one or more BASIC programs.

SPECIFY

- Voltage (110V AC, 60 Hz): No specify required.

Bibliography:

- "IBM Personal Computer 3278/79 Emulation Adapter Technical Reference Manual for the Advanced Adapter Addendum" (#6575): Provides detailed information about the Personal Computer 3278/79 Emulation Adapter (#5050) for users of the IBM Personal Computer Technical Reference Manual (#5005).
- "IBM Personal Computer 3278/79 Emulation Adapter Hardware Maintenance and Service Manual Addendum" (#6585): Provides detailed maintenance information about the Personal Computer 3278/79 Emulation Adapter (#5050) for users of the IBM Personal Computer Hardware Maintenance and Service Manual, (#5072). Also contains a diagnostic diskette.
- "Display Station Emulation Adapter Hardware Maintenance and Technical Reference Manual Version 2" (#2883): Provides maintenance information for a Display Station Emulation Adapter (#2887) used with the 5520/Personal Computer Attachment Program Version 2, (#2884). This manual will enable the customer to perform problem diagnosis to the field replaceable unit level.
- "Display Station Emulation Adapter Hardware Maintenance Manual" (#2889): Provides maintenance information for a Display Station Emulation Adapter (#2887) used with the 5520/Personal Computer Attachment Program Version 1, (#2888) or the Personal Computer 5250 Emulation Program, (#2885). This manual will enable the customer to perform problem diagnosis to the field replaceable unit level.
- "Learning to Use DOS 2" (#4080): A guide to the use of the IBM Personal Computer DOS - Version 2. It takes new users of DOS step-by-step through the most commonly used DOS 2 commands. The course starts with the fundamentals of DOS. It then moves on to the use of the fixed disk and a list of similarities and differences between DOS 2 and DOS 1.1. Rather than teaching complex concepts, it teaches step-by-step procedures to accomplish everyday tasks.
- "IBM Personal Computer Technical Reference" (#5005): This manual is designed to provide hardware design and interface information. The publication also provides Basic Input/Output System (BIOS) information as well as programming support material. The manual is intended for programmers, engineers involved in hardware and software design, designers, and interested persons who have a need to know how the 5150 is designed and works.
- "BASIC Reference Manual" (#5010): The 5150 BASIC interpreter consists of three upward compatible versions: Cassette, Disk, and advanced. This manual is a reference for all three versions of BASIC release 1.10. The manual is packaged in a 3-ring loose-leaf binder, and it is shipped as a standard item with each 5150.
- "IBM Personal Computer Hardware Maintenance and Service" (#5072): Provides step-by-step instructions that aid the user in identifying the failure of an IBM Personal Computer Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the necessary information to complete the repair activity (i.e., adjustments, replacements, etc.).
- "IBM 4700 Personal Computer Hardware, Hardware Maintenance and Service" (6361605)* Provides step-by-step instructions that aid the user in identifying the failure of an IBM 4700 Personal Computer Financial Option Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the necessary information to complete the repair activity (i.e., adjustments, replacement, etc.).
- "Enhanced Display Station Emulation Adapter Hardware and Technical Reference Manual": Provides maintenance information for an Enhanced Display Station Emulation Adapter used with Enhanced 5250 Emulation Program. This manual will enable the customer to perform problem diagnosis to the field replaceable unit level.

* (NO LONGER AVAILABLE - See Technical Directory, P/N 6024448 for update.)

SPECIAL FEATURES

PC Network Adapter (#0213): Allows the 5150 to be connected to form an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at 2 million bits per second. Each PC on the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor, an Intel 82586 network controller, a fixed-frequency modem, and network microcode that off loads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75M Hz transmit frequency and a 219M Hz receive frequency form transmission on a single-cable broadband network. Direct memory access is used for data transfer. The Network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network Adapter is provided with a 9-foot cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1,000 feet from the 5178 unit. Limitations: Each user who is to share an application program on a PC Network must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit; DOS Version 3.1 or later if the PC Network Program is to be used. Maximum: One. Customer Setup: Yes.

PC Network Base Expander (#0230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to eight Short Distance Kits, Medium Distance Kits, and/or Long Distance Kits in any combination to further extend the distance between the PC with the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

PC Network Short Distance Kit (#0231): Provides one-foot of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Medium Distance Kit (#0232): Provides 400-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Long Distance Kit (#0233): Provides 800 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 25-Foot Cabling Segment (#0234): Provides 25 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC

Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 50-Foot Cabling Segment (#0235): Provides 50 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 100-Foot Cabling Segment (#0236): Provides 100 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 200-Foot Cabling Segment (#0237): Provides 200 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Transformer Unit (#0238): Is packaged separately from the 5178 PC Network Translator Unit, however, it is required for the operation of the 5178 PC Network Translator Unit and is a 120-volt transformer which plugs into a standard grounded outlet. Field Installation: Yes. Customer Setup: Yes.

Math Co-processor Option (#1002): Provides for the addition of the Intel 8087 Processor as a companion to the Intel 8088 to increase speed and precision in arithmetic, logarithmic, and trigonometric functions. The Option Kit provides a matched Intel 8088 along with the Intel 8087 to ensure high performance. The Intel 8087 multiplies 32-bit and 64-bit floating point numbers approximately 80 times faster than the Intel 8088. This option is supported only by IBM Personal Computer APL and by the Macro Assembler "escape" instruction. Maximum: One. Field Installation: Yes. The customer is responsible for ensuring that the Math Co-processor Option is installed by a technically skilled person. It is recommended that IBM or an IBM-authorized Personal Computer Dealer install this option.

64Kb Memory Module Kit (#1003): Provides a 64Kb increment of parity-checked random access memory which may be plugged into sockets on the 5150 system board (mdls 104, 114, 164, 174, X14, X64 X74 only) or the 64/256Kb Memory Expansion Option (#1013). The 64Kb Memory Module Kits are sold as small, plug-in circuits with instructions for user installation. Maximum: Up to three 64Kb Memory Module Kit increments may be customer installed on the system board, to provide an additional 192Kb of memory. The 64/256Kb Memory Expansion Option provides 64Kb of memory as standard. Up to three 64Kb Memory Module Kit increments may be customer-installed on a 64/256Kb Memory Expansion Option, to provide an additional 192Kb of memory. Field Installation: Yes. Prerequisites: Available sockets on the 5150 system board or available sockets on a 64/256Kb Memory Expansion Option. Customer Setup: Yes.

64/256Kb Memory Expansion Option (#1013): Increments system memory by 64Kb (65,536 bytes) and is easily expandable to 256Kb by plugging in additional increments of 64Kb with 64Kb Memory Module Kits (#1003). The 64/256Kb Memory Expansion Option is packaged as a circuit card designed to plug into one of the 5150's five system expansion slots. Technical Information: Random access memory -- starting address is set by switches -- 250ns access time -- 410ns memory cycle time -- parity checking -- sockets for expansion to 256KB. Limitations: The 5150 supports a maximum addressable memory of 640K bytes. The combination of the memory installed on the system board, and any installed 64/256Kb Memory Expansion Options, and 64Kb Memory Module Kits must not exceed a total of 640Kb of memory. The 64/256Kb Memory Expansion Option must be installed in the 5150 System Unit and not in a 5161 Expansion Unit. Maximum: A maximum of two 64/256Kb

Memory Expansion Options may be installed in a 5150. Field Installation: Yes. Prerequisites: The system board must have 256Kb of memory installed (mdls 104, 164, 176 only) before adding any additional memory via memory expansion options. An available system expansion slot is required for each 64/256Kb Memory Expansion Option. Customer Setup: Yes.

Keyboard (#1100) (NO LONGER AVAILABLE): The keyboard is attached to the 5150 with a 1.8m (6 ft.) coiled cable, permitting adaptation to a variety of work environments. The 83-key keyboard, with an adjustable typing angle, offers commonly-used data and word processing functions in a design that combines the familiar typewriter and calculator pad layouts. All non-control keys are typematic (repeating). Ten program-supported function keys (total of 40 possible functions using keyboard shift keys) are standard. Special symbols, such as those used to draw lines, may be accessed with a combination of keys. Depending on the application program, from ten to forty special function keys may be supported. Other keys, like those used to print the current screen contents, correct a typing error, or "scroll" a long document, are clearly labeled. Access to all 256 characters (ASCII and special) is provided by the use of the ALT key. The keyboard is plugged directly into the 5150. The approximate dimensions of the keyboard are: 57mm (2.5 in.) height, 500mm (20 in.) width, 200mm (8 in.) depth. The approximate weight is 2.8kg (6 lbs). Maximum: One. Field Installation: Yes. Customer Setup: Yes.

Enhanced Graphics Adapter (#1200): Provides a 9-pin connector on the end of the card for a display that presents a direct-drive RGB (Red, Green, Blue) signal. This Adapter contains 64Kb of graphics memory. It supports four colors at a resolution of 640 pels x 350 pels, an 8 x 14 character box for color text, and 256-characters in text mode. A character generator can be loaded from RAM to allow any set of 256-characters to be used. One light pen can be attached to this adapter in addition to one display via the P-2 connector (6-pin Berg strip on the side of the card). This adapter provides support for one of the following: 5154 Enhanced Color Display, 5151 Monochrome Display, 5153 Color Display or another direct-drive display. Two modes are supported by the Enhanced Graphics Adapter - the enhanced mode which is required for the 5154 Display if its 640 x 350 resolution and selection from up to 64 colors are to be used and - the enhanced display emulation mode which supports the 5151, 5153, and 5154 displays and all the modes provided by the Monochrome Display and Printer Adapter (plus the addition of an all-points-addressable graphics mode for the 5151 Display that is not provided by the Monochrome Display and Printer Adapter and the Color/Graphics Adapter (plus certain graphics support for the 5153 Display that is not provided by the Color/Graphics Adapter (16 colors for 40 columns in 320 x 200 resolution and 16 colors for 80 columns in 640 x 200 resolution). Limitations: Composite video support for attaching analog monitors or TV sets is not provided. A light pen is not supported when the Enhanced Graphics Adapter is used with the 5151 Display. This adapter cannot be installed in the 5161 Expansion Unit. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Graphics Memory Expansion Card (#1201): Provides 64Kb of graphics memory for a total of 128Kb on the Enhanced Graphics Adapter to support up to 16 colors at the 640 x 350 resolution and up to 512 text characters. With the Graphics Memory Module Kit (#1203), the Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card will support up to 1,024-characters (up to eight 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (#1200) plus any prerequisites of that feature. Maximum: One. Customer Setup: Yes.

Graphics Memory Module Kit (#1203): Provides 128Kb of graphics memory for a total of 256Kb on the Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card (#1201) to support up to 1,024-characters (up to eight 128-character set), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (#1200)

with the Graphics Memory Expansion Card (#1201) plus any prerequisites of those feature. Maximum: One. Customer Setup: Yes.

Binary Synchronous Communications (BSC) Adapter (#1204): The BSC Adapter when used with the BSC 3270 Emulation Program (6024037) can be used to emulate 3270 interactive BSC operation. The adapter provides the ability for a 5150 attached to a host system via communications lines to participate in a network using BSC protocol. The network may be either switched or nonswitched line. When used as a 3270 with the BSC 3270 Emulation Program, the 5150 operates as and appears to a host as one of the following 3270 devices:

3271 mdl 2/	
3277 mdl 2	Nonswitched line
3274 mdl 51C/	
3278 mdl 2	Nonswitched line
3275 mdl 2	Switched and
	nonswitched line
3276 mdl 2	Nonswitched line

Cluster Adapter (#1206): Permits the 5150 to be included in a cluster of interconnected personal computers which can include the PCjr, the 5150, 5155, 5160, 5170, XT/370, AT/370 and 5331 Industrial PC. The clustered IBM Personal Computer configuration utilizes baseband signaling and carrier sense multiple access with collision avoidance (CSMA/CA) access protocol. The topology of the interconnection is a bus environment using 75-ohm coaxial cable. The data transmission is 375Kb per second. The Cluster Program is provided to support up to 64 PCs in a clustered configuration. This program permits small work groups in schools and businesses to exchange messages and data files and optionally to share a fixed disk that contains programs. Messages and files can be transferred between any two PCs in the cluster and a message can be broadcast from one PC to all other PCs in the cluster. When a fixed disk is to be shared, the PC in the cluster with the fixed disk must be designated as a disk server. When a disk server PC is defined, a download option is made available which will permit downloading DOS, the cluster program, and an application program from the disk server PC to a remote PC in the cluster when the remote computer is powered on. Limitations: Each user who is to share an application program on a cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit; DOS Version 2.1 or later. If the 5150 is designated as the disk server computer, it must have 256Kb of memory and one fixed disk. The cluster program requires a maximum of 29Kb of resident memory except when the PC is utilized as a disk server when a maximum of 136Kb of memory is required. DOS requirements must be added to the cluster program size to determine the memory available for application programs. Maximum: One. Customer Setup: Yes.

Cluster Cable Kit (#1207): Is used to interconnect the first two PCs in an IBM PC cluster and attaches to the Cluster Adapter (#1206). Each PC in the cluster after the first two also requires a cluster cable kit. The Cluster Cable Kit provides a main coaxial cable bus of approximately 32 feet, two cable drops approximately 9-feet each for attachment to the main coaxial cable and to the BNC connectors of a cluster adapter, two BNC T-connectors for attaching the cable drops to the main coaxial cable and two terminating plugs. Maximum: One. Customer Setup: Yes.

256Kb Memory Expansion Option (#1209): Provides 256Kb of parity-checked random access memory on a 5-inch card. Access time of the memory on the 256Kb Memory Expansion Option card is 290ns and the cycle time is 840ns. This card can be installed in any full-feature slot on the 5150 System Unit. For the 5150, this feature can be installed instead of the 64/256Kb Memory Expansion Option with three 64Kb Memory Module Kits to add 256Kb to the 5150 at a lower cost and/or to be able to use a special-feature instead of a full-feature slot for the additional 256KB. Limitations: This adapter cannot be installed in the 5161 unit. Maximum: One with one 64/256Kb Memory Expansion Option with 64Kb or 128Kb to provide 576Kb or 640Kb. Field Installation: Yes. Prerequisites: The system unit must be at its maximum memory for this feature to be installed. Customer Setup: Yes.

(Except LAD > IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <)

(Except LAD > IBM PC Network Adapter II supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD > A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL). <)
- (Except LAD > National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD > Specified Operating Environment

- Machine requirements

IBM PC Network Adapter II requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <)

(Except LAD > IBM PC Network Baseband Adapter (#1221, P/N 1501221): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30 (8530).

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to eight workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to ten daisy chains with eight workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately.<

(Except LAD> IBM PC Network Baseband Adapter supports English US and National Languages for English UK, French, German, Italian and Spanish.<)

- (Except LAD> A feature card for IBM Personal System/2 Model 30 and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.
- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than eight nodes.<
- (Except LAD> National Language Support for English, German, French, Spanish and Italian.<)

(Except LAD> Specified Operating Environment

Machine Requirements

IBM PC Network Baseband Adapter requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

Programming requirements:

- IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873).<

Game Control Adapter (#1300): Provides support for two customer-supplied joysticks for video game interaction, allowing the user to move an object on the screen in any direction, or it supports up to four customer-supplied game "paddles" for simple horizontal or vertical movement. Maximum: One. Field Installation: Yes. Prerequisites: An available special or full-feature system expansion slot. Customer Setup: Yes.

Prototype Card (#1400): Professional engineers or hobbyists may utilize the Prototype Card as a base for building and testing custom attachments to the system. The Prototype Card is designed to plug into one of the 5150's five expansion slots. It is a full-size, high-quality circuit board. Circuitry and module holes are provided for interface with the IBM bus. A bracket is included to secure the card in the 5150 with a cut-out provided for up to a 37-pin external connector. Detailed instructions and component identifications are included for I/O decode attachment logic. Technical Information: Physical dimensions -- 107mm (4.2 in.) high x 335mm (13.2 in.) long -- completely etched and drilled with plated-through holes -- pre-printed circuitry for interface to IBM bus -- attachment bracket and screws included -- block diagram and I/O decode logic description included. Field Installation: Yes. Prerequisites: An available system expansion slot. Customer Setup: Yes.

Data Acquisition and Control Adapter (#1502): Provides analog input/output channels and digital input/output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis, and quality control testing in laboratory, pilot plant, or full-scale production lines. The adapter provides four analog input channels with throughput to memory at 15,000 conversions per second, two analog output channels with throughput to memory at 25,000 conversions per second both with

12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of option for analog input/output channels and programmed I/O mode for digital input/output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit or in the 5161 unit for each adapter desired. Maximum: Four. Customer Setup: Yes.

General Purchase Interface Bus Adapter (#1503): Provides an interface between an IBM Personal Computer and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters, and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300KB/second and programmed I/O data rate of up to 10KB/second. It allows the user to select interrupt level and memory access channels. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit or in the 5161 unit for each adapter desired. Maximum: Four. Customer Setup: Yes.

Data Acquisition and Control Adapter Distribution Panel (#1504): Provides easy access to the I/O signals, voltages, and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34 inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with four barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change, or remove the instruments and/or control points being used. Field Installation: Yes. Prerequisites: An Adapter Acquisition and Control Adapter for each panel desired. Maximum: Four. Customer Setup: Yes.

Asynchronous Communications Adapter (#2074): Provides a channel to data processing or input/output devices outside of the immediate system. Such devices can be connected by telephone using a plug-in modem, or directly by cable when the device is nearby. The communication "target" may be a large host computer, a Series/1, another 5150/5160, a paper tape reader, a communicating typewriter, a laboratory instrument, or other machines providing the popular RS-232-C asynchronous interface. This adapter is flexible enough to match most of the computers and related products available in the microcomputer marketplace. The user's program selects the appropriate speed (50-9600 bps), format (5-, 6-, 7-, or 8-bit characters), parity and stop bits to reflect the attached device. Once communication has been established, the user's program performs reads and writes. Interrupts permit the program to perform data processing such as calculating, diskette reading or writing, or printing, and then pause to resume communications when a signal appears on the line. The adapter provides an EIA RS-232-C interface. One 25-pin "D" shell, male-type connector is provided to attach various peripheral devices. In addition, a current-loop interface is located in the same connector. A jumper block is provided to select manually either the voltage or the current-loop interface. Maximum: Two. Cable: A user-supplied communication cable is required for connection of external modems or other devices to the Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available special or full-feature system expansion slot is required. Customer Setup: Yes.

Technical Information: EIA RS-232-C interface -- operates at up to 9600 bps with switched or nonswitched line support -- provides modem control functions -- facilitates program controlled data transfer -- supports electrical wrap and error status reporting -- prioritized interrupt system controls. Limitations: Only one BSC Adapter may be installed if an SDLC Adapter is installed in the same system. Maximum: Two. Cable: The Communications Adapter Cable (#2067) allows the user to connect the BSC Adapter card to a modem via a plug at the rear of the 5150. The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is

provided to test the cable. Field Installation: Yes. Prerequisites: An available system expansion slot. Software such as the BSC 3270 Emulation Program is required for communication. An external modem must be cable-connected between the BSC Adapter and the telephone line. Customer Setup: Yes.

SDLC Communications Adapter (#2090) (NO LONGER AVAILABLE): The SDLC Communications Adapter when used with the SNA 3270 Emulation and RJE Support Program (6024036) permits the 5150 to emulate 3270 interactive SNA operation or 3770 batch SNA. The adapter provides the ability for a 5150 attached to a host system via communications lines to participate in a network using SDLC protocol. When used as a 3270 with the SNA 3270 Emulation and RJE Support Program, the 5150 operates as and appears to a host as a 3278 mdl 2 attached to a 3274 mdl 51C. Technical Information: EIA RS-232-C interface -- operates at up to 9600 bps (up to 4800 bps when used with the SNA 3270 Emulation and RJE Support Program) with switched or nonswitched line support (including multipoint) -- provides modem control functions -- facilitates program-controlled data transfer -- supports electrical wrap and error status reporting -- prioritized interrupt system controls. Limitations: Only one Asynchronous Communications Adapter may be installed if the SDLC Communications Adapter is installed. Maximum: One. Cable: The Communications Adapter Cable (#2067) allows the user to connect the SDLC Communications Adapter card to a modem via a plug at the rear of the 5150. The cable is double-shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available system expansion slot. Software such as the SNA 3270 Emulation and RJE Support Program (6024036) is required to allow communication. An external modem must be cable-connected between the SDLC Communications Adapter and the telephone line. Customer Setup: Yes.

3278/79 Emulation Adapter (#5050): Expands the capabilities of the 5150 by providing attachment to the 3274 and 3276 Control Unit, the 4331 or 4361 Processor Display/Printer Adapter, or the 4361 Workstation Adapter or the 4701 Finance Communication Controller or the 9370 Workstation Adapter. When used with the IBM PC 3270 Emulation Program, Entry Level the 5150 can emulate the functions of an 3278 Display Station mdl 2 or a 3279 Color Display Station mdl 2A or S2A and can also support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS session can be active concurrently and the user can interact with either session alternately. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5150 system unit expansion slot is required. Customer-supplied attachment media is required for host system attachment. Software such as the IBM PC 3270 Emulation Program, Entry Level is required. A 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required to allow for file transfer. For attachment to the 4331, specify code #9843 must be installed on the 4331. For attachment to the 4701, the Device Cluster Adapter (#3101) must be installed on the 4701. For attachment to the 9370, specify code #6020 must be installed. Limitations: File transfer is supported on the 4701 only with the IBM 4770 Personal Computer Applications Services Program Product. For additional information, limitations, and prerequisites, see dated April 2, 1986.

IBM Token-Ring Network PC Adapter II (#5063): Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS) and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitation: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

Remote 5250 Emulation Program (#2874): The Remote 5250 Emulation Program allows a single IBM Personal Computer to emulate a 5294 Remote Control Unit with an IBM Personal Computer emulating a 5291 or 5292-1 workstation and/or workstation printer attached over a communication line to a S/36 or S/38. The IBM

Personal Computer in IBM 5250 emulation mode has access to all functions of the host system available to a display station operator, providing the user with the power to the S/36 or S/38. The IBM Personal Computer can also operate a stand-alone personal computer.

Prerequisites:

1. IBM Personal Computer Disk Operating System (DOS) Version 2 Modification Level 0, Version 2 Modification Level 1, Version 3 Modification Level 0, or later compatible versions.
2. SDLC Communication Adapter (#1502090) (NO LONGER AVAILABLE) and Communications adapter cable (#1502067).
3. At least 256Kb of memory in the IBM Personal Computer.
4. 5-1/4 inch double sided diskette drive (320K) and adapter or 5-1/4 inch diskette drive (1.2M) and adapter in IBM Personal Computer AT.

Highlights:

- The Personal Computer emulates a 5291, 5292-1, and a 5292-2 (subset) work station and a 5256 matrix printer or 5219 printer. Dual drawer selection is not supported.
- Can be used like a 5291, 5292-1, 5292-2 display and 5256 or 5219 printer; single drawer.
- Writes the contents of the display screen on an IBM Personal computer printer if the IBM Personal Computer has a printer attached or can be directed to a host attached printer.
- Allows concurrent access to the IBM Personal Computer Fixed Disk while the IBM Personal Computer Remote 5250 Emulation Program is active.
- Provides the capability to establish two host sessions and one IBM Personal Computer session.
- Host sessions can be a single display session, a display session and a printer emulation session, or two display sessions.
- Uses "Hot Key" sequence to switch among sessions.
- The IBM Personal Computer printer can be used to emulate an IBM 5256 Matrix Printer or IBM 5219 Printer.
- When the host sessions are not displayed on the IBM Personal Computer display, they remain active and continue processing the host application.
- The IBM Personal Computer session is active only when displayed on the IBM Personal Computer Display.
- Provides predefined keyboard configurations for a 5291 or IBM Personal Computer keyboard or allows the user to define the keyboard to satisfy his requirements.
- Printer Emulation remains active while in IBM Personal Computer mode unless suspended by the operator.
- Virtual disk support when used with PC Support/36.
- Virtual diskette support when used with the File Support Utilities.

Limitations:

- Magnetic stripe reader, selector light pen, and multinational character sets for 5250 family of displays are not supported.
- As a result of physical differences between displays, some information displayed on the 5291 and 5292 may appear differently on the IBM Personal Computer Display.
- The Enhanced 5250 Emulation Program will work with most IBM Personal Computer programs. However, programs that overlay the emulator, that use the same interrupt level, that use Virtual Device Interface (VDI) Host Graphics Support or are sensitive to the address at which they are loaded may not be compatible. Interrupt Level 5 is used by the Enhanced Display Station Emulation Adapter and may not be modified.

MACHINES

- When using the Enhanced 5250 Emulation Program Version 2.1 with the IBM Personal Computer-System/36 Transfer Facility PRPQ or the IBM Personal Computer-System/38 Transfer Facility PRPQ users must ensure that they sign onto the system before executing the Transfer Facility programs.
- Communications on the PC cannot be active when using the Enhanced Graphics Adapter (EGA) and/or Voice Communication Option Asynchronous Data Communication, Function Set. The Host Graphics Support, 5259 Subset, will plot output to plotters attached to the IBM Personal Computer via the async port.
- Communication may be active with the Color Graphic Adapter (CGA) or the Professional Graphics Controller (PGA).
- To display graphics data in the host graphics session, the DOS session must be dedicated to the GR5250.COM program. This is accomplished by running the GR5250.COM program in the DOS session. The DOS session can be readily made available at any time for user's program(s) by terminating the GR5250.COM program.
- The 5219 printer emulation does not have dual drawer selection support.

The English US version on the Enhanced 5250 Emulation Program Version 2.1 does not support PC keyboards character set other than English US. National language versions of the program are required to support national language keyboards character set.

Configuration Requirements on S/36 and S/38: The S/36 and S/38 must have the appropriate communications adapter installed. See the machine sections of the S/36 and S/38 for the communication features.

Packaging: The Remote 5250 Emulation Program (#2874) consists of a user's guide, two 5-1/4 inch double sided diskettes (320K) with the remote emulation program, display station status stick-on labels, and keyboard templates.

Enhanced 5250 Emulation Program (#2875): When used with the Enhanced Display Station Emulation Adapter, the IBM Personal Computer can be attached to a S/34, S/36, or S/38 as a peripheral either locally via the work station controller or remotely via the 5251-12. The IBM Personal Computer can also be attached to the S/36 or S/38 remotely via the 5294 Remote Control Unit. The IBM Personal Computer emulates a 5291 workstation and a 5256 Matrix Printer or 5219 Printer. The IBM Personal Computer in 5250 emulation mode has access to all functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The IBM Personal Computer can also function as a stand-alone personal computer.

Highlights:

- Allows the IBM Personal Computer to operate as a stand-alone personal computer or as a 5250 workstation and printer.
- Can be the only device on a twinaxial line or intermixed with other displays and/or printers on the same line attached to the S/34, S/36, or S/38.
- Can be used like a 5291-1, 5292-1, 5292-2 display and 5256 or 5219 printer; single drawer.
- (selected countries > Can be used as the system console for the S/34 and S/36. <)
- Writes the contents of the display screen on an IBM Personal Computer printer if the IBM Personal Computer has a printer attached or can be directed to a host attached printer.
- Can be used as an alternate console on the S/34 or S/36.
- Allows concurrent access to the IBM Personal Computer Fixed Disk while the Enhanced 5250 Emulation Program is active.
- Provides the capability to establish two host sessions and one IBM Personal Computer Session.

- Host sessions can be a single display session, a display session and a printer emulation session, or two display sessions.
- Uses "Hot Key" sequence to switch among sessions.
- The IBM Personal Computer printer can be used to emulate an IBM 5256 Matrix Printer or IBM 5219 Printer.
- When the host sessions are not displayed on the IBM Personal Computer display, they remain active and continue processing the host application.
- The IBM Personal Computer session is active only when displayed on the IBM Personal Computer Display.
- Provides predefined keyboard configurations for a 5291 or IBM Personal Computer keyboard or allows the user to define the keyboard to satisfy his requirements.
- Allows the host workstation addresses to be set by an IBM Personal Computer program. There are no physical switches for these functions.
- Automatic twinaxial termination with Integrated Attachment Cable. No on card switch or termination plug required.
- Printer Emulation remains active while in IBM Personal Computer mode unless suspended by the operator.
- Virtual disk support when used with PC Support/36.
- Virtual diskette support when used with the File Support Utilities.
- The Personal Computer emulates a subset of the 5292-2. Due to product hardware differences between the 5292-2 and the emulation, some graphic orders may be accepted, checked for validity, but have no function.
- Table driven printer provides 5256 or 5219 emulation for a variety of Personal Computer printers and OEM printers, both parallel and serial that are RS-232 compatible.
- IBM 5201 Quietwriter Printer (mdl 001) is supported as an emulated 5219 and 5256 printer.
- Keyboard Enhancement
 - Keystroke buffering (key ahead).
 - "Hot key" can be in keystroke playback string.
 - Redefine the "hot key" to other keys instead of the "ALT-ESC".
 - Direct hot keying to emulated or DOS session.
 - Printer session
 - Support keystroke playback string.
 - Uses the customized layout.
 - Playback string increased to 510.
- Additional Graphics Adapter Support
 - 5292-2 Subset

Enhanced Graphic Adapter (EGA)
Professional Graphic Controller (PGA)

- Conversion program for keyboard profiles to Version 2.1
- Upgrade kit to upgrade to Version 2.1

Limitations:

- Magnetic stripe reader, selector light pen, and multinational character sets are not supported with the IBM Personal Computer attachment.
- Because of the physical differences between displays, some information displayed on the 5291 and 5292-1 may appear differently on the IBM Personal Computer Display (e.g. The IBM Personal Computer does not support an identical character set with the 5250, the color adapter does not support under-scoring, column separators are different, and color on the color monitors is different).

- The Enhanced 5250 Emulation Program will work with most IBM Personal Computer programs. However, there are some programs that may not be compatible, such as a program that overlays the emulator or a program that support the same interrupt level or a program that is sensitive to the address it is loaded at in IBM Personal Computer storage.

Prerequisites:

1. IBM Personal Computer Disk Operating System Version 1 Modification Level 1, Version 2 Modification Level 0, Version 2 Modification Level 1, Version 3 Modification Level 0 or later compatible versions.
2. Enhanced Display Station Emulation Adapter.
3. At least 128Kb of memory in the IBM Personal Computer.
4. One available full-feature system expansion slot.
5. 5-1/4 inch double sided diskette drive (320K) and adapter or 5-1/4 inch diskette drive (1.2M) and adapter in IBM Personal Computer AT.

Configuration Requirements on the S/34, S/36 and S/38:

1. The IBM Personal Computer with the Enhanced Display Station Emulation Adapter and Enhanced 5250 Emulation Program may be attached to any model of the S/34, S/36, or S/38 that is not already fully configured with the maximum permissible number of workstations.
2. Maximum: The maximum number of IBM Personal Computers that can be attached locally to the S/34, S/36, or S/38 is the same as the maximum number of workstations allowed on each system.
3. IBM Personal Computers may be intermixed with other 5250 workstations and workstation printer up to combined total of seven IBM Personal Computers, workstations, and/or workstation printers per cable port as a distance of up to 1,524 meters from the system. Cable-thru is supported via the Integrated Attachment Cable (#2877).
4. Remote attachment of more than one IBM Personal Computer in a single location requires a 5251-12 with a cluster or dual cluster feature or a 5294 Remote Control Unit.

Packaging: The Enhanced 5250 Emulation Program (#2872) consists of a user's guide, a 5-1/4 inch double sided diskette (320K) containing the emulation program, display station status stick-on labels, and keyboard templates.

Integrated Attachment Cable (#2877): Required to permit attachment of the Enhanced Display Station Emulation Adapter to the system twinaxial cables of the S/34, S/36, S/38, 5294 Remote Control Unit or 5251-12. Prerequisites: Enhanced Display Station Emulation Adapter. Maximum: One. Field Installation: Yes.

Enhanced Display Station Emulation Adapter (#2871): (Enhanced Display Station Emulation Adapter Installation and Problem Determination Manual and Enhanced Display Station Emulation Adapter Diagnostic Diskette) Allows connection of the 5150 to the S/34, S/36, or S/38 either locally through the workstation controller or remotely via a 5251-12. The 5150 can also be connected remotely to the S/36 and S/38 via the 5294 Remote Control Unit. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot in the 5150 System Unit is required. The Integrated Attachment Cable (#2877) is required to attach the adapter to the twinaxial cable. Customer Setup: Yes.

Installation Convenience Kit (#2870): The Enhanced 5250 Emulation Installation Convenience Kit (#2870) includes the Enhanced Display Station Emulation Adapter, Enhanced 5250 Emulation Program Version 2.1, integrated attachment cable, Keyboard Enhancement 5250 Emulation Program Version 2.1 template, and manuals necessary to install the Enhanced Display Station Adapter and Enhanced 5250 Emulation Program in the IBM Personal Computer.

5253 Emulation Installation Convenience Kit Version 2 (#2882): Provides the following items necessary to permit attachment of the 5150 to the 5520 Administrative System:

Display Station Emulation Adapter (#2887)
5520/Personal Computer Attachment Program Version 2 (#2884)
T-connector (#2891)
Twinaxial Cable Assembly (#2892)

When emulating a 5253, the 5150 user has access to the word- and record-processing functions, storage, distribution facilities, and most other functions of the 5520 Administrative System. This option (#2882) provides the function of the 5253 Emulation Installation Convenience Kit Version 1 (#2890) plus expanded configuration support, 3270 emulation, display of special characters and symbols, and usability enhancements. Maximum: One. Field Installation: Yes. Customer setup: Yes. Prerequisites: A 5150 with a minimum of 128Kb of user memory, an available full-feature system expansion slot, one 5-1/4 inch Diskette Drive Adapter (#3780), one 5-1/4 inch Diskette Drive (single-sided, #3800 (NO LONGER AVAILABLE) or double-sided, #3810 (NO LONGER AVAILABLE)) and one of the following display options: A) A 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900), or B) A 5153 Color Display and the Color/Graphics Monitor Adapter (#4910), or C) a user-supplied 80-column color video monitor and the Color/Graphics Monitor Adapter (#4910). One Terminator (#2893) is required only if the 5150 is the last display station or only display station on a twinaxial line. IBM Personal Computer Disk Operating System (DOS) Version 2 (6024061) is required. Limitations: The 5150 should not be used as the master display station or as the alternative master display station on the 5520 Administrative System.

5250 Emulation Convenience Kit (#2886): Provides the following items necessary to permit attachment of the 5150 to the System/34, System/36, or System/38:

Display Station Emulation Adapter (#2887)
Personal Computer 5250 Emulation Program (#2885)
T-connector (#2891)
Twinaxial Cable Assembly (#2892)

Allows connection of a 5150 as a peripheral to a S/34, S/36, or S/38 either as a locally-attached workstation or remotely by using a 5251-12. The 5150 in 5250 emulation mode has access to the functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The 5150 can also operate as a stand-alone personal computer. Maximum: One. Prerequisites: A 5150 with a minimum of 64Kb of user memory, an available system expansion slot, one 5-1/4 inch Diskette Drive Adapter (#3780), one 5-1/4 inch Diskette Drive (single-sided #3800 (NO LONGER AVAILABLE) or double-sided #3810 (NO LONGER AVAILABLE)), and one of the following display options: A) A 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900), or B) A 5153 Color Display and the Color/Graphics Monitor Adapter (#4910), or C) A user-supplied 80-column color video monitor and the Color/Graphics Monitor Adapter (#4910). One Twinaxial Cable Adapter (#2894) is required in place of the T-connector if the 5150 is the last display station or only display station on a twinaxial line. IBM Personal Computer Disk Operating System (DOS) is required. Limitations: The Display Station Emulation Adapter (#2887) must be installed in the 5150 system unit and not in a 5161 Expansion Unit.

Display Station Emulation Adapter (#2887): Allows connection of the 5150 to the 5520 Administrative System or to the S/34, S/36, or S/38. When used with the 5520/Personal Computer Attachment Program Version 1 (#2888) or Version 2 (#2884), a 5150 equipped with this option has access to the word processing, records processing, storage, distribution, and 3270 emulation (Version 2 only) facilities of a local 5520 system. When used with the Personal Computer 5250 Emulation Program (#2885), a 5150 equipped with this option can be connected to a S/34, S/36, or S/38 either as a locally attached workstation or remotely by using a 5251-12 Display Station. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. For attachment of this option to the 5520 Administrative System, a T-connector (#2891) and Twinaxial Cable Assembly (#2892) are required. In addition, a Terminator (#2893) is required if the 5150 is the last display station,

or only display station, on a twinaxial line. For attachment of this option to a S/34, S/36, or S/38, a Twinaxial Cable Assembly (#2892) is required. In addition, a T-connector (#2891) is required if the 5150 is not the last device on a twinaxial line. A Twinaxial Cable Adapter (#2894) is required in place of the T-connector if the 5150 is the last or only device on a twinaxial line. Customer setup: Yes. Limitations: When used with the Personal Computer 5250 Emulation Program (#2885) or the 5520/Personal Computer Attachment Program Version 1 (#2888) this option must reside in the 5150 system unit and not in a 5161 Expansion Unit.

5253 Emulation Installation Convenience Kit Version 1 (#2890): Provides the following items necessary to permit attachment of the 5150 to the 5520 Administrative System:

Display Station Emulation Adapter (#2887)
5520/Personal Computer Attachment Program Version 1 (#2888)
T-connector (#2891)
Twinaxial Cable Assembly (#2892)

When emulating a 5253, the 5150 user has access to the word- and record-processing functions, storage, distribution facilities, and most other functions of the 5520 Administrative System. Maximum: One. Field Installation: Yes. Customer setup: Yes. Prerequisites: A 5150 with a minimum of 64Kb of user memory, an available system expansion slot, one 5-1/4 Inch Diskette Drive Adapter (#3780), one 5-1/4 Inch Diskette Drive (single-sided (#3800) (NO LONGER AVAILABLE) or double-sided (#3810) (NO LONGER AVAILABLE)), a 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900). One Terminator (#2893) is required only if the 5150 is the last display station or only display station on a twinaxial line. IBM Personal Computer Disk Operating System (DOS) Version 1.1 (6024001) is required. Limitations: The 5150 should not be used as the master display station or as the alternative master display station on the 5520 Administrative System. The 5150, when operating in 5253 emulation mode, cannot emulate a 3270 through the 5520 Administrative Processing Program. The Display Station Emulation Adapter (#2887) must be installed in the 5150 system unit and not in a 5161 Expansion Unit.

T-connector (#2891): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the system twinaxial cables of the 5520 Administrative System or the S/34, S/36, or S/38. Limitations: Required for S/34, S/36, or S/38 attachment only if the 5150 is not the last device on the cable. Prerequisites: #2892 is required. Maximum: One. Field Installation: Yes.

Twinaxial Cable Assembly (#2892): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the system twinaxial cables of the 5520 Administrative System or the S/34, S/36, or S/38. Prerequisites: #2887. Maximum: One. Field Installation: Yes.

Terminator (#2893): Required to permit attachment of the Personal Computer/Display Station Emulation Adapter (#2887) to the 5520 Administrative System if the 5150 is the last display station, or only display station, on a twinaxial line. Prerequisites: #2891 and #2892. Maximum: One. Field Installation: Yes.

Twinaxial Cable Adapter (#2894): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the S/34, S/36, or S/38 if the 5150 is the last or only device on a twinaxial line. Prerequisites: #2892. Maximum: One. Field Installation: Yes.

Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Personal Computer with a network adapter to the Cabling System or directly to an access unit.

Token-Ring Network PC Adapter (#3391): Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system and an attachment cable (#3390) for attaching to the Cabling System data grade media or a filter (available from cabling system distributors) for attaching to Cabling System Type 3

specified telephone media. Limitations: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

Stick-On Keytop Labels - PC Style (#3606): These labels can be placed on the IBM Personal Computer keytops for 5250 emulation in personal computer style. One set is provided in the 5364 shipping carton. This feature should be ordered only for additional set(s) of labels.

Stick-On Keytop Labels - 5250 Style (#3641): These labels can be placed on the IBM Personal Computer keytops for 5250 emulation in 5250 style. One set is provided in the 5364 shipping carton. This feature should be ordered only for additional set(s) of labels.

Enhanced Display Station Emulation Adapter (#3690): Permits a 5150 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Mdl 12; or remotely via the 5294 Remote Control Unit to emulate a 5250 workstation. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 5150 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 5150 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. One or two host sessions and one personal computer session can be active concurrently. Limitations: When used with the Enhanced 5250 Emulation Program, this Adapter cannot be installed in the 5161 Expansion Unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit. Maximum: One. Customer Setup: Yes.

Displaywriter/Personal Computer Attach Convenience Kit (#3728): Permits a Displaywriter system (without any communications features installed in the diskette unit) to be cable-connected to a 5150 via an Asynchronous Communications Adapter. The Compact Printer Connector Adapter (#0102) is also required. This attachment allows a Displaywriter to participate in a PC Cluster. When the Displaywriter is attached to a stand-alone 5150, the Displaywriter is used for operational control. Functions supported include transfer of documents and files between the Displaywriter and the 5150 including conversion of the document to revisable form text document content architecture (RFTDCA) prior to transfer to the 5150, and conversion from RFTDCA before transfer of documents to the Displaywriter. It is recommended that only DOS print files be transferred to the Displaywriter. Additional functions include the ability to display directories of the 5150 and Displaywriter, deletion of documents and files on either system unit, and an optional foreground execution facility which supports alternating between Displaywriter/Personal Computer Attach program functions and Textpack 4 or Textpack 6 functions. Limitations: Each user who is to share an application program on a PC Cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit. Maximum: One. Customer Setup: Yes.

5-1/4 Inch Diskette Drive Adapter (#3780): Provides for the attachment of up to two 5-1/4 inch diskette drives. Both single-sided and double-sided drives are supported by the adapter. The adapter is a standard feature with 5150 models 166 and 176. Limitations: The 5-1/4 Inch Diskette Drive Adapter must be installed in the 5150 System Unit and not in the 5161 Expansion Unit. Maximum: One. Field Installation: Yes. Prerequisites: An available system expansion slot is required. Customer Setup: Yes.

5-1/4 Inch Single-Sided Diskette Drive (#3800) (NO LONGER AVAILABLE): Provides for the 5150 to read and write data on one side of a soft-sectored 5-1/4 inch diskette. Formatted storage capacity is approximately 160Kb (180Kb with IBM Personal Computer DOS 2.0). The diskette drive has the following characteristics: Track density: 48 tracks per inch -- number of tracks: 40 per surface -- data surfaces: 1 per diskette -- rotational speed: 300 rpm -- access time: 8ms track-to-track -- data transfer rate: 20,480 bytes per second. The 5-1/4 Inch Single-Sided Diskette Drive resides inside the 5150 to provide diskette access from the front. Two drives may be installed, but the left-hand drive is always used to load the disk operating system or machine language program at power-on. Maximum: Up to two 5-1/4 Inch Single or Double-Sided Diskette Drives may be installed in a 5150. Field Installation: Yes. Prerequisites: #3780. Customer Setup: Yes.

5-1/4 Inch Double-Sided Diskette Drive (#3810) (NO LONGER AVAILABLE): Allows the 5150 to read and write data on both sides of a soft-sectored 5-1/4 inch diskette. Formatted storage capacity is approximately 320Kb (360Kb with IBM Personal Computer DOS 2.0). The diskette drive has the following characteristics: Track density: 48 tracks per inch -- number of tracks: 40 per surface -- data surfaces: 2 per diskette -- rotational speed: 300 rpm -- access time: 6ms track-to-track -- data transfer rate: 20,480 bytes per second. The 5-1/4 Inch Double-Sided Diskette Drive resides inside the 5150 to provide diskette access from the front. Two drives may be installed, but the left-hand drive is always used to load the disk operating system or machine language program at power-on. Maximum: Up to two 5-1/4 inch Single or Double-Sided Diskette Drives may be installed in a 5150. Field Installation: Yes. Prerequisites: #3780. Customer Setup: Yes.

Personal System/2 Display Adapter (#4050, 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of one of the following displays: 8503, 8512, 8513 and 8514.

6157 Tape Attachment (#4156, P/N 59X4156): This feature allows attachment of the 6157 Streaming Tape Drive for use with the 5364 unit.

It is recommended that both the 5364 and its directly attached PC be dedicated to tape operation when the tape drive is being used. If the system is not dedicated, in most cases rated speed and capacity of the tape drive will not be achieved. See the M5364 pages for additional description and limitations.

5364 Driver Card (#4548): Allows connection of the IBM S/36 5364 System Unit. It is compatible with the IBM Personal Computer (5150), the IBM Personal Computer XT (5160), and the IBM Personal Computer AT (5170). Only one Driver Card may be installed. The personal computer must have a minimum of 256K and not more than 512K. See the 5364 Sales Manual Pages for additional limitations. Attachment is made through a 1.2m (47 in.) cable provided with the 5364 System Unit.

The 5364 Driver Card is shipped for convenience as an accessory to the 5364. It should not be ordered separately. Additional cards are available as an option on the IBM Personal Computer. These additional cards must be ordered through the parts replacement process.

The 5364 Driver Card is shipped for convenience, as an accessory, with the 5364. This option should be ordered only if an extra 5364 Driver Card is required. The 5364 Driver Card has a 3-month carry-in warranty. If the personal computer has on-site maintenance, the on-site maintenance will also apply to the 5364 Driver Card.

Monochrome Display and Printer Adapter (#4900): Provides for the attachment of both the 5151 Monochrome Display mdl 001 and the 5152 Graphics Printer mdl 002. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5150. Limitations: The primary monitor/display adapter must be installed in the 5150 System Unit and not in the 5161 Expansion Unit. Maximum: One. Cable: The Printer Cable (#5612) is available to connect the 5152 mdl 002 to the Monochrome Display and Printer Adapter. Field Installation: Yes. Prerequisites: An available system expansion slot. Customer Setup: Yes.

Color/Graphics Monitor Adapter (#4910): Provides for the attachment of a color display to the 5150. Either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5153 Color Display mdl 001, a video monitor, or through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16

foreground and eight background colors are supported in text (character) mode. This attachment also provides support for 4-color medium resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 dots horizontal, 200 vertical). 256 characters are available in "text" mode, 128 in medium-or high-resolution graphics. The adapter provides 16Kb of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Limitations: The primary monitor/display adapter must be installed in the 5150 System Unit and not in the 5161 Expansion Unit. Maximum: One. Field Installation: Yes. Prerequisites: An available system expansion slot. Customer Setup: Yes.

High Speed Adapter (#4920): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner of the 5150 Personal Computer. This adapter is installed into full-size expansion slot of 5150 Personal Computer system unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M BPS. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS-422-A driver and Receiver. The adapter is designed to the EIA RS-422-A electrical interface and provides one 25-pin "D" shell, mail type connector. Maximum: One. Cable: Communication Adapter Cable (P/N 1502067) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Limitation: The High Speed Adapter must be installed in the 5150 System Unit and not in a 5161 Expansion Unit. Publication: "Guide To Operations" (6456788)

"Guide To Operations"

- #2701, GA18-2476, English US
- #2753, GA09-0378, Canadian French
- #2702, GA10-0125, Spanish

Publications available at a fee for the IBM Personal Computer High Speed Adapter are: "High Speed Adapter Guide To Operations"

- 6456785, GA10-0125, Spanish
- 6456786, GA09-0378, Canadian French
- 6456788, GA18-2476, English US

"High Speed Adapter Hardware Maintenance and Service"

- 6455787, SY18-2167, English US

"High Speed Adapter Technical Reference"

- 6455771, SC18-2117, English US

3117 Adapter (#4925): Allows connection of the 3117 Scanner to the 5150 Personal Computer. This adapter is installed into full-size expansion slot of the 5150 system unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005) is required. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Limitation: Can not be installed in the 5161 Expansion Unit. Publication: "Guide To Operations" (6456831)

"Guide To Operations"

- #2702, GA18-2477, English US
- #2751, GA09-0375, Canadian French
- #2708, GA10-8813, Spanish

Publications available at a fee for the IBM Personal Computer 3117 Adapter are: "Guide To Operations for the IBM 3117 Scanner and the 3117 Adapter"

- 6456831, GA18-2477, English US
- 65X1747, GA09-0375, Canadian French
- 65X1745, GA10-8813, Spanish

"IBM 3117 Scanner Hardware and Service"

- 6456833, SY18-2159, English US
- 65X1748, SY11-1018, French

"IBM 3117 Scanner Technical Reference"

- 6456837, SC18-2105, English US

Printer Adapter (#5200): Provides for attachment of the 5152 Graphics Printer mdl 002. This option is used when the Color/Graphics Monitor Adapter (#4910) is selected instead of the Monochrome Display and Printer Adapter (#4900), or when support for more than one printer is required and the Monochrome Display and Printer Adapter is already installed. The adapter provides a connector for attachment of the printer cable to the rear of the 5150. Maximum: One. Cable: The Printer Cable (#5612) is available to connect the 5152 mdl 002 to the Printer Adapter. Field Installation: Yes. Prerequisites: An available special or full-feature system expansion slot. Customer Setup: Yes.

(Except LAD> PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes.<)

(Except LAD>The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported.<)

(Except LAD> Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
Depth - 336mm (13.26 in.)
Height - 107.95mm (4.25 in.)
Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <)

4700/PC Options: The following IBM 4700 Personal Computer Options are provided to permit attachment of 4700 Finance Communication System input devices and 4700 Finance Communication Printers.

Financial Input Adapter (#6049)
Financial Output Adapter (#6052)

The following IBM 4700 Personal Computer Option is provided to permit encryption/decryption capabilities in the personal computer. Data encrypted/decrypted in the personal computer may be decrypted/ encrypted in the 4701/4702 using the same algorithm.

Financial Security Adapter (#6054)

IBM 4700 Personal Computer Financial Input Option (#6049): This option allows the attachment of 4704 Finance Keyboards, Magnetic Readers, Magnetic Reader/Encoder, 4706 Document Code-line and Magnetic Stripe Reader and clear and encrypting PIN Pads running DOS 2.1 or later. Each option contains the Financial Input adapter card, the Financial Input Connector Assembly, installation and problem determination procedures, diagnostic diskette, microcode

diskette with device drivers and configuration customization, and a microcode users guide. The keyboard attachment is transparent to DOS applications. Keyboards may be combined in the following way:

- Finance Administrative Keyboard stand-alone
- Finance Extended Alphameric Keyboard stand-alone
- PC Keyboard stand-alone
- Finance Extended Alphameric Keyboard with Finance Function Keyboard
- Finance Alphameric Keyboard with Finance Function Keyboard
- PC Keyboard with Finance Function Keyboard*

* This combination is valid only in a PC application and not in the terminal emulation of the 4700 Personal Computer Application Services.

One magnetic reader or reader/encoder or IBM 4706 Document Code-line and Magnetic Stripe Reader and one clear or encrypting pin pad may be attached in addition to the keyboard combinations listed above. They may be accessed by DOS applications via standard DOS device drivers provided. For more information about finance keyboards, magnetic readers, magnetic reader/encoder, and clear or encrypting PIN pads, see 4704 in Machine section. Prerequisite: An IBM Personal Computer with 256Kb on system board. Maximum: One. Limitations: This adapter must be installed in the system unit and not in a Expansion Unit.

IBM 4700 Personal Computer Financial Output Option (#6052): This option allows the attachment of a single Finance Printer from this list using DOS 2.1 or later:

4710 Receipt/Validations Printer
4715 Continuous Forms Printer
4720 Forms/Passbook Printer - mdls 1, 2, 3, or 4

The adapter card handles the 4700 loop protocol and data stream to the devices. It supports a single device with one or two logical device addresses. It attaches only devices that adhere to the 4700 Universal Device Processor protocols. Each option contains the Financial Output adapter card, the Financial Output Cable, installation and problem determination procedures, diagnostic diskette, microcode diskette with device drivers and configuration customization, and a microcode users guide. For more information about finance output devices, see 4710, 4715, and 4720 in "Machine" section. Prerequisite: An IBM Personal Computer with 256Kb on system board. Maximum: One. Limitations: The adapter must be installed in the system unit and not in a Expansion Unit. With this adapter installed memory is limited to 576KB.

IBM 4700 Personal Computer Financial Security Option (#6054): It allows an application program running DOS 2.1 or later to encrypt and decrypt data for communications and files using the ANSI (X3.92 - 1981) Data Encryption Algorithm (DEA). The user can have the added security of encryption for sensitive communications data transmitted from the personal computer to another source over communications lines. The user can also protect sensitive programs and data stored on personal computer files via encryption. Each option contains the Financial Security adapter card, installation and problem determination procedures, diagnostic diskette, microcode diskette with adapter support, and a microcode users guide. Included is support to set the master and session keys. The functions of the adapter may be accessed by DOS applications via standard DOS device drivers provided. The algorithm used is the same as that used in the 4701/4702. Prerequisite: An IBM Personal Computer with 256Kb on system board. Maximum: One. Limitations: This adapter must be installed in the system unit and not in a Expansion Unit.

(Canada only> IBM Enhanced Graphics Adapter (EGA) Jumper Card (#6583): Provides an external synchronization from the IBM 4055 InfoWindow Display to allow overlay of text and graphics stored on the IBM Personal Computer with video stored on a video disc player. Technical Information: The IBM Enhanced Graphics Adapter Jumper Card attaches to the feature connector of the IBM

Enhanced Graphics Adapter and to the IBM General Purpose Interface Bus Adapter (IRQ connector Row B, pins 2-6). Maximum: One. Field Installation: Yes. Prerequisites: IBM Enhanced Graphics Adapter and IBM General Purpose Interface Bus Adapter. Customer Setup: Yes. Publications: "Enhanced Graphics Adapter Jumper Card Guide to Operations" (GA27-3744, P/N 8575145) (<)

8100 PC Adapter (#7630): Allows connection of a 5150 to an available station address on a local or remote RLOOP in an 8100 Information System configuration. Remote attachment of the 5150 requires a 3843 Loop Control Unit. This feature provides an adapter card, a 5-1/4 in. diskette with the 8100 PC Adapter Programs, the external cable required for attachment to an 8100 loop station connector, the 8100 PC Adapter User's Manual and the 8100 PC Adapter Keyboard Template. When the 5150 is loop-connected to an 8100 operating with DPCX/DOSF Release 4, it allows the following functions to be supported: 3270 display emulation, 5287 Printer emulation support, Bidirectional file transfer between the 5150 and the 8100, S/370 host file transfer and screen capture to print the screen image to the 5150 printer or diskette. Limitations: The adapter is mutually exclusive with the SDLC adapter and cannot operate concurrently with an Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5150 unit. Maximum: One. Customer Setup: Yes.

4683 Model 2 Attachment Adapter Kit (#8314) (P/N 83X7654): The 4683 Model 2 Attachment Adapter Kit provides the necessary adapter card, software, diagnostics, installation aid and instructions for attaching one or two 4683 Model 2 to an IBM Personal Computer. The kit consists of the following:

- IBM 4683 Model 2 Adapter Card and Wrap Plug
- Ship group that contains:
 - Lock Accessory Kit
 - Diskette Kit

Publications:

- IBM 4683 Model 2 Attachment Adapter Kit: Installation Guide
- IBM 4683 Model 2 Attachment Adapter Kit: Problem Determination Guide
- IBM 4680 Store System Terminal Operations Guide
- Guide to Operations IBM Personal Computer: 4683 Model 2 Attachment Adapter

The combination of the 4683 Model 2 and Attachment Adapter Kit connected to and installed on the IBM Personal Computer described in the specified operating environment provides the capability to attach up to two 4683 Model 2 Point-of-Sale Terminals. The Attachment Kit is applicable to all small store environments where an in-store IBM Personal Computer and Application Program are available to meet the requirements. Limitations: Maximum of One Attachment Adapter. Prerequisites: An available full-feature slot in the system unit. Field Installation: Yes. Customer Setup: Yes.

Hardware Service and Maintenance Manual (#9205): Available and can be purchased for the 5364 Driver Card. The 5364 Driver Card is a unique card designed for the specific purpose of directly attaching a personal computer to the 5364 System Unit. A Technical Reference Manual for this card will not be provided. Individuals requiring interface information on the 5364 Driver Card may contact the IBM Corporate Communications Department.

ACCESSORIES (NONE)

SUPPLIES

See your Country DP Supplies Coordinator.

5151 MONOCHROME DISPLAY**PURPOSE**

The 5151 Monochrome Display is a high-resolution video monitor which provides for the display of alphameric output from programs running on the 5150 Personal Computer, the 5160 Personal Computer XT, or the 3270 Personal Computer.

MODEL**Model 001**

Prerequisites: The Monochrome Display and Printer Adapter (#4900) is required on the 5150 Personal Computer system or on the 5160 Personal Computer XT system. The 5151 Monochrome Display is supported by the IBM Personal Computer DOS (Versions 1.0, 1.1, and 2.0), CP/M-86*, and the UCSD p-System**, Version IV.

* Trademark of Digital Research, Inc.

** Trademark of the Regents of the University of California

Customer Setup (CSU): The 5151 Monochrome Display is a customer setup machine. Detailed setup and operation instructions are included with each machine. The customer is responsible for unpacking the 5151, attaching it to the Monochrome Display and Printer Adapter, and obtaining an operating system version that supports the 5151, or the 5271 System Unit.

Limitations: The 5151 Monochrome Display attached to the IBM Monochrome Display and Printer Adapter cannot be used to display dot-addressable graphic images such as those that can be created by programs written under Advanced BASIC. A set of line and block graphic characters is supported for simple display drawings and graphs.

Maximum: One per system.

HIGHLIGHTS

- A high-resolution, direct-drive display designed for use with IBM Personal Computer applications requiring alphameric output (such as text processing, programming, and problem solving).
- A 292mm (11-1/2 in.) (diagonal) display with a green phosphor screen. The screen area provides for 25 rows of 80 characters. Alphameric characters are 7x9 dots in a 9x14 dot box. Both upper and lower case letters can be displayed. The character attributes provide underline, blinking, high inten-

sity, reverse image, and non-display. In addition to the normal alphameric characters, a large number of special characters are provided.

- Easily adjusted with front-mounted brightness and contrast controls available to the operator. The Monochrome Display may be placed either on top of the system unit or on a nearby table top or desk.
- Supplied with signal and power cables (approximate length 914mm (3 ft) each). The signal cable is plugged into a Monochrome Display and Printer Adapter which is inserted into an available system expansion slot. The AC power cable is plugged into the system unit, allowing the system unit power On/Off switch to also control the display unit.
- The 5151 Monochrome Display has the following characteristics:
 - Screen size: 292mm (11-1/2 in.) (diagonal) monitor.
 - CRT: High-persistence green phosphor (P39) with etched surface to reduce glare.
 - Video signal: Maximum video bandwidth of 16.27 MHz. Screen refreshed at 50 Hz with 350 vertical lines of resolution and 720 lines of horizontal resolution. Horizontal drive frequency 18.432 kHz, TTL compatible.
- Dimensions:
 - Width - 380mm (15 in.)
 - Depth - 350mm (14 in.)
 - Height - 280mm (11 in.)
 - Weight - Approximately 7.9kg (17 pounds)

SPECIFY

- Voltage: (120V AC, 60Hz): No specify required.

SPECIAL FEATURES (NONE)**MODEL CONVERSIONS (NONE)****ACCESSORIES (NONE)****SUPPLIES (NONE)**

5152 GRAPHICS PRINTER

PURPOSE

The 5152 Graphics Printer model provides a versatile, low-cost, quality dot matrix printer for the 5150 Personal Computer, the 5160 Personal Computer XT, the 3270 Personal Computer and the 5292-2 Color Graphics Display. It allows printing of graphic images and an expanded set of text characters. It is a bidirectional printer that prints at 80 characters per second on continuous-feed, single- or multi-part forms.

MODELS

Model 002: Graphics Printer

Prerequisites: A separately purchased Printer Cable (#5612). System or Expansion Unit attachment is made through either the Monochrome Display and Printer Adapter or Printer Adapter using the printer cable option. 5292-2 attachment is made via the Printer Connector on the 5292-2. The 5152 Graphics Printer is supported by the IBM Personal Computer DOS (Versions 1.0, 1.1, and 2.0), CP/M-86*, and the UCSD p-System**, Version IV.

* Trademark of Digital Research, Inc.

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Customer Setup (CSU): The 5152 Graphics Printer is a customer set-up machine. Detailed setup and operation instructions are included with each machine. The customer is responsible for unpacking the 5152, assembling the printer, attaching it to the system unit, connecting the Printer Cable (#5612), and obtaining an operating system version that supports the 5152.

HIGHLIGHTS

- Bidirectional printing
- 80 characters per second rated speed (nominal)
- Line buffer for performance
- 12 character styles
- Normal, compressed, and emphasized modes with double strike, subscript, and superscript. Normal- and double-width combinations, 24 modes in all.
- Character font: 9x9 dot matrix
- Expanded character set consisting of:
 - 96 standard ASCII characters
 - accented alphabets
 - box drawing
 - gray tone
 - block
 - Greek characters
 - math
- Underlining

- Variable form length
- Skip to top of next page (manual or programmed)
- Horizontal tab stops
- Warning beep when out of forms or activated from system unit
- Printer self-test
- Replaceable print head
- Replaceable ribbon cartridge, black ribbon
- The 5152 Graphics Printer has the following characteristics:
 - Print method: Impact dot matrix
 - Character size (normal):
 - Width - 2.1mm (0.08 in.)
 - Height - 3.2mm (0.12 in.)
 - Paper feed: Adjustable pinfeed tractors
 - Paper: Continuous form
 - Paper width: From 101.6mm (4 in.) to 254mm (10 in.)
 - Copies: One original with two carbon copies
 - Paper thickness: 0.3mm (0.01 in.) maximum
 - Line spacing: 4.23mm (1/6 in.), or programmable
 - Columns: 80 (normal size)
 - 40 (double width size)
 - 132 (condensed size)
 - 66 (condensed - double width size)
 - Dimensions:
 - Length - 400mm (16 in.)
 - Depth - 370mm (15 in.)
 - Height - 110mm (4.5 in.)
 - Weight - Approximately 5.9kg (13 lbs.)

SPECIFY

- Voltage: (120V AC, 60 Hz): No specify required.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Printer Cable (#5612): Required for attachment to the Monochrome Display and Printer Adapter or the Printer Adapter. Also required for attachment to the 5292-2 Printer Connector.

Printer Stand (#5614): Supports the 5152 Graphics Printer and holds fanfold paper.

SUPPLIES

Contact IBM.

5153 COLOR DISPLAY**PURPOSE**

The 5153 Color Display provides the capability for programs running on the 5150 Personal Computer system or the 5160 Personal Computer XT system to display text and graphics output in color.

MODELS**I Model 001: (NO LONGER AVAILABLE)**

Prerequisites: A 5150 Personal Computer system or a 5160 Personal Computer XT system with the Color/Graphics Monitor Adapter (#4910) is required. The 5153 Color Display is supported by the IBM Personal Computer DOS (Versions 1.0, 1.1, and 2.0), CP/M-86*, and the UCSD p-System**, Version IV.

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Customer Setup (CSU): The 5153 is a customer setup machine. Detailed setup and operational instructions are included with each machine. The customer is responsible for unpacking the 5153, attaching it to the Color/Graphics Monitor Adapter, and obtaining an operating system version that supports the 5153.

Limitations: For word processing and other text use, the 5153 and Color/Graphics Monitor Adapter provide lower resolution than that obtainable with the Monochrome Display and Printer Adapter.

Maximum: 1.

HIGHLIGHTS

- High resolution, direct-drive display.
- Connected to the 5150 or 5160 with the Color/Graphics Monitor Adapter and a 1.5m (5 ft) cable that is provided.
- 330mm (13 in.) (diagonal) monitor capable of displaying 16 colors.

- Easily adjusted with front-mounted brightness and contrast controls.

- The 5153 Color Display has the following characteristics:

- Screen size: 330mm (13 in.) (diagonal) monitor, 640 (horizontal) x 200 (vertical) addressability
- Colors: 16 (red, green, blue, white, yellow, black, cyan, magenta, brown, light gray, dark gray, light blue, light green, light cyan, light red, and light magenta)
- Horizontal scanning frequency: 15.75K Hz +/- 200 Hz.
- Vertical drive: 60 Hz.
- Operating temperature: 16 to 32C ambient (60 to 90F).
- Storage temperature: 10 to 43C (50 to 110F).
- Relative humidity: 8 to 80 percent (non-condensing) when on -- 20 to 80 percent (non-condensing) when off.
- Dimensions:
 - Width: 394mm (15-1/2 in.)
 - Depth: 432mm (17 in.)
 - Height: 292mm (11-1/2 in.)
 - Weight: Approximately 12kg (26 lbs.)

SPECIFY

- Voltage (120V AC, 60 Hz, 1 A, 240 BTU/hour): No specify required.

SPECIAL FEATURES (NONE)**MODEL CONVERSIONS (NONE)****ACCESSORIES (NONE)****SUPPLIES (NONE)**

5154 ENHANCED COLOR DISPLAY

PURPOSE

The 5154 Enhanced Color Display when used with the Enhanced Graphics Adapter (#1200) provides an improved color graphics level for the 5150 Personal Computer, 5160 Personal Computer XT, and 5170 Personal Computer AT systems.

MODELS

Model 1 001

Model 2 002

Model 3 003

Maximum: One.

Prerequisites: A 5150 Personal Computer system, 5160 Personal Computer XT system, or a Personal Computer AT system with the Color Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) is required. The 5154 Enhanced Color Display is supported by the IBM Personal Computer DOS (Versions 2.1, 3.0, 3.2), CP/M-86* and the USCD p-System**, Version IV.

* Trademark of Digital Research Inc.

** Trademark of the Regents of the University of California

Customer Setup (CSU): The 5154 is a customer setup machine. Detailed setup and operational instructions are included with each machine. The customer is responsible for unpacking the 5154, attaching it to the Color Graphics Monitor Adapter or the Enhanced Graphics Adapter, and obtaining an operating system version that supports the 5154.

HIGHLIGHTS

- High resolution, direct drive display
- Connected to the 5150, 5160 or 5170 with the Color Graphics Monitor Adapter or the Enhanced Graphics Adapter and a 1.08m (3.6 ft) cable that is provided.
- 330mm (13 in.) (diagonal) monitor capable of displaying 64 colors, when attached to the Enhanced Graphics Adapter.
- Easily adjusted with front-mounted brightness and contrast controls.
- Vertical hold and vertical size controls provided on the rear panel.
- High contrast and reduced glare provided by the dark etched screen.

- Non-interlaced operation when attached to the Enhanced Graphics Adapter.
- The 5154 Enhanced Color Display has the following additional characteristics:
 - 640 (horizontal) x 350 (vertical) addressability when attached to the Enhanced Graphics Adapter.
 - 16 out of a palette of 64 colors when attached to the Enhanced Graphics Adapter.
 - Horizontal scanning frequency of 15.75K Hz for the Color Graphics Monitor Adapter or 22K Hz for the Enhanced Graphics Adapter in enhanced mode.
 - Vertical scan frequency of 50 to 60 Hz.
 - Operating temperature: 16 degrees C to 32 degrees C ambient (60 degrees F to 90 degrees F)
 - Storage temperature: 10 degrees C to 43 degrees C (50 degrees F to 110 degrees F)
 - Relative humidity: 8% to 80% (non-condensing) when on; 20% to 80% (non-condensing) when off.
 - Dimensions:
 - Width - 394mm (15-1/2 in.)
 - Depth - 432mm (17 in.)
 - Height - 292mm (11-1/2 in.)
 - Weight - 14.5kg (32 lbs.)

SPECIFY

- Voltage (120V AC, 60 Hz, 1 A, 300 BTU/hour): No specify required.
- Voltage (192-255V AC, 50/60 Hz, IEC 380, TUV GS safety mark): No specify required.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5155 PORTABLE PERSONAL COMPUTER

(NO LONGER AVAILABLE...SPECIAL FEATURES CAN STILL BE ORDERED.)

PURPOSE

The 5155 Portable Personal Computer is functionally equivalent to the stand-alone 5150. Software is available to allow stand-alone use for applications such as professional decision-making support, word processing, computer-based training, business accounting, and home entertainment. It should be proposed in situations where portability is an essential customer requirement.

MODELS

Model 068: System Unit/Keyboard, 256KB Memory, 5-1/4 inch. Diskette Drive Adapter, one 5-1/4 inch Double-Sided Diskette Drive.

Model 076: System Unit/Keyboard, 256KB Memory, 5-1/4 inch. Diskette Drive Adapter, two 5-1/4 inch Double-Sided Diskette Drives.

Prerequisites: None

Customer Setup (CSU): The 5155 and all special features are customer setup.

HIGHLIGHTS

The 5155 consists of a lightweight casing with a carrying handle containing a built-in 9-inch amber composite monitor, one 5-1/4 inch double-sided diskette drive (with space for an optional second drive) on the Model 068, and two 5-1/4 inch double sided diskette drives as standard on the model 076, and two attachment options (a diskette adapter and a color/graphics monitor adapter). Five expansion slots (one long and four short) are available for connecting most of the 5150 PC options. The system board is the same as that of the 5160 PC XT with 256KB of memory. The system has identical function and performance characteristics to an equivalently configured 5150 PC.

- The following features are supplied as standard with the 5155:

- Intel 8088 Microprocessor
4.77 MHz clock speed
410ns cycle time
Parity checking
250ns memory access time
256KB random access memory
 - Lightweight 83-key keyboard
 - Five available expansion slots (one long and four short)
 - 5-1/4 inch double-sided diskette drive(s) and adapter
- Uses Modified Frequency Modulation (MFM) to read and write Six milliseconds track-to-track access time.

Note: Not interchangeable with diskette drives for 5150 PC, 5160 PC XT, or 4860 PCjr

- Nine inch amber composite video monitor (80 columns, 25 lines)
- Protective lightweight carrying case
- Some of the options available for the 5155 Portable PC include:
 - Attachment of the 5161 Expansion Unit mdl 001 which provides: 10MB Fixed Disk Drive for increased storage capacity
 - 5153 Color Display
 - 5181 Compact Printer
 - 5182 Color Printer

- 8087 Mass Coprocessor (#1002)
- Binary Synchronous Communication Adapter (#1204)
- SDLC Communication Adapter (#2090)
- 3278/3279 Simulation Adapter
- PC Cluster Adapter
- Asynchronous Communication Adapter
- 3852-2 Color Jetprinter
- 3812 Pageprinter

- The following are not supported:

- 160KB Diskette Drive (#3800)
- 320KB Diskette Drive (#3810)
- 5151 Monochrome Display
- Monochrome Display and Printer Adapter (#4900)
- 32KB Memory Expansion Option (#1012)
- IBM Personal Computer XT 5161 Expansion Unit (mdl 002)
- Cassette Tape

- Highlights of the BASIC-80 Interpreter include:

- Full screen editor for easy program creation and modification
- Select 40- or 80-character display lines
- Up to 16 foreground and 8 background colors (with appropriate monitor and adapter)
- Automatic line numbering
- 40-character variable names (all characters significant)
- Multiple statements per program line
- 250 characters per program line
- Comments on program lines
- Up to 17-digit numeric precision
- Supports sequential cassette files
- Error trapping
- Addressable workspace up to 60KB
- Integer/real/string variables
- Single-and double-precision floating point numbers

When turned on, the 5155 automatically runs a power-on self-test to verify system readiness. If the validation is successfully completed, the BASIC ROM Interpreter (cassette level) is made ready and identified on the display screen. The user may now enter a program from the keyboard or diskette. If a failure is found, an identifying number will appear on the screen. If a diskette drive is installed, the 5155 automatically loads from the diskette drive. This is typically the Disk Operating System (DOS) or an application program. The DOS may in turn invoke the Disk or Advanced levels of BASIC, followed then by the manual or automatic execution of one or more BASIC programs.

Keyboard: The keyboard is attached to the 5155 with a 30-inch coiled cable, permitting adaptation to a variety of work environments. The 83-key keyboard, with an adjustable typing angle, offers commonly-used data and word processing functions in a design that combines the familiar typewriter and calculator pad layouts. All non-control keys are typematic (repeating). Ten program-supported function keys (total of 40 possible functions using keyboard shift keys) are standard. Special symbols, such as those used to draw lines, may be accessed with a combination of keys. Depending on the application program, from ten to forty special function keys may be supported. Other keys, like those used to print the current screen contents, correct a typing error, or "scroll" a long document, are clearly labeled. Access to all 256 characters (ASCII and special) is provided by the use of the ALT key. The keyboard is plugged directly into the 5155. The approximate dimensions of the keyboard are: 57mm (2.5") height, 500mm (20") width, 200mm (8") depth. The approximate weight is 1.8kg (4 lbs). Maximum: One. Field Installation: Yes. Customer Setup: Yes.

Dimensions:

Height: 204mm (8 inch)
Width: 500mm (20 inch)
Depth: 430mm (17 inch)
Weight (approx): 13.6kg (30 lbs.)

Publications

"IBM Portable Personal Computer Guide To Operations", P/N 6936571: Provides information on installation, problem determination procedure, operating the 5155, and moving the system.

"IBM Portable Personal Computer Technical Reference Manual" (6936572)

"IBM Portable Personal Computer Hardware, Maintenance, and Service Manual" (6936573)

"IBM Portable Personal Computer Technical Reference" (6936572): This manual is designed to provide hardware design and interface information. The publication also provides Basic Input Output System (BIOS) information as well as programming support material. The manual is intended for programmers, engineers involved in hardware and software design, designers, and interested persons who have a need to know how the 5150 is designed and works.

"BASIC Reference Manual" (6025010): The 5150 BASIC interpreter consists of three upward compatible versions: Cassette, Disk, and Advanced. This manual is a reference for all three versions of BASIC release 1.10. The manual is packaged in a 3-ring loose-leaf binder, and it is shipped as a standard item with each 5150.

"Enhanced Display Station Emulation Adapter Hardware and Technical Reference Manual": Provides maintenance information for an Enhanced Display Station Emulation Adapter used with the Enhanced 5250 Emulation Program. This manual will enable the customer to perform problem diagnosis to the field replaceable unit level.

SPECIFY

- Voltage (115V or 230V AC, 50 or 60 Hz).

SPECIAL FEATURES

Network Adapter (#0213): Allows the 5155 to be connected to form an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at 2 million bits per second. Each PC on the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor, an Intel 82586 network controller, a fixed-frequency modem, and network microcode that offloads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75 MHz transmit frequency and a 219 MHz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The Network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network Adapter is provided with a 9-foot cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1000 feet from the 5178 unit. Limitations: Each user who is to share an application program on a PC network must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5155 unit; DOS Version 3.1 or later if the PC Network is to be used. Maximum: One. Customer Setup: Yes.

Network Base Expander (#0230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to eight Short Distance Kits, Medium Distance Kits, and/or Long Distance

Kits in any combination to further extend the distance between the PC with the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

PC Network Short Distance Kit (#0231): Provides one foot of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Medium Distance Kit (#0232): Provides 400 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Long Distance Kit (#0233): Provides 800 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 25-Foot Cabling Segment (#0234): Provides 25 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 50-Foot Cabling Segment (#0235): Provides 50 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 100-Foot Cabling Segment (#0236): Provides 100 feet of cable to attach a PC with a PC Network Adapter Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 200-Foot Cabling Segment (#0237): Provides 200 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Transformer Unit (#0238): The PC Network Transformer Unit is packaged separately from the 5178 PC Network Translator Unit. However, it is required for the operation of the 5178 PC Network Translator Unit and is a 120-volt transformer which plugs into a standard grounded outlet. Field Installation: Yes. Customer Setup: Yes.

5-1/4 Inch Slimline Diskette Drive (#0300): The drive which is fully self contained, is double-sided with 40 tracks per side. It uses Modified Frequency Modulation (MFM) to read and write data with a track-to-track access time of 6 milliseconds. Limitations: The 5155 diskette drive is not interchangeable with the diskette drive of the 5150, 5160, or 4860. Field Installation: Yes.

Math Co-processor Option (#1002): Provides for the addition of the Intel 8087 Processor as a companion to the Intel 8088 to increase speed and precision in arithmetic, logarithmic, and trigonometric functions. The Option Kit provides a matched Intel 8088 along with the Intel 8087 to ensure high performance. The Intel 8087 multiplies

32-bit and 64-bit floating point numbers approximately 80 times faster than the Intel 8088. This option is supported by IBM Personal Computer APL, IBM Personal Computer Pascal Compiler, IBM Personal Computer FORTRAN Compiler and by the Macro Assembler "escape" instruction. Maximum: One. Field Installation: Yes. The customer is responsible for ensuring that the Math Co-processor Option is installed by a technically skilled person. It is recommended that IBM or an IBM-authorized Personal Computer Dealer install this option.

64/256KB Memory Expansion Option (#1013): The 64/256KB Memory Expansion Option is packaged as a circuit card designed to plug into the 5155's full-function expansion slot. Technical Information: Random access memory -- starting address is set by switches -- 250ns access time -- 410ns memory cycle time -- parity checking -- sockets for expansion to 256KB. Limitations: The combination of the memory installed on the system board must not exceed a total of 512KB of memory. The 64/256KB Memory Expansion Option must be installed in the 5155 System Unit and not in a 5161 Expansion Unit. Maximum: A maximum of one 64/256KB Memory Expansion Options may be installed in a 5155. Field Installation: Yes. Prerequisites: An available long expansion slot is required for the 64/256KB Memory Expansion Option. Customer Setup: Yes.

PC Cluster Adapter (#1206): Permits the 5155 to be included in a cluster of interconnected personal computers which can include the IBM PCjr, the 5150, 5155, 5160, 5170, XT/370, AT/370 and 5531 Industrial PC. The clustered IBM Personal Computer configuration utilizes baseband signaling and carrier sense multiple access with collision avoidance (CSMA/CA) access protocol. The topology of the interconnection is a bus environment using 75-ohm coaxial cable. The data transmission is 375KB per second. The Cluster Program is provided to support up to 64 PCs in a clustered configuration. This program permits small work groups in schools and businesses to exchange messages and data files and optionally to share a fixed disk that contains programs. Messages and files can be transferred between any two PCs in the cluster and a message can be broadcast from one PC to all other PCs in the cluster. When a fixed disk is to be shared, the PC in the cluster with the fixed disk must be designated as a disk server. When a disk server PC is defined, a download option is made available which will permit downloading DOS, the cluster program, and an application program from the disk server PC to a remote PC in the cluster when the remote computer is powered on. Limitations: Each user who is to share an application program on a cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5155 unit: DOS Version 2.1 or later. If the 5155 is designated as the disk server computer, it must have 256KB of memory and one fixed disk. The cluster program requires a maximum of 29KB of resident memory except when the PC is utilized as a disk server when a maximum of 136KB of memory is required. DOS requirements must be added to the cluster program size to determine the memory available for application programs. Maximum: One. Customer Setup: Yes.

Cluster Cable Kit (#1207): The Cluster Cable Kit is used to interconnect the first two PCs in an IBM PC cluster and attaches to the Cluster Adapter (#1206). Each PC in the cluster, after the first, two also requires a cluster cable kit. The Cluster Cable Kit provides a main coaxial cable bus of approximately 32 feet, two cable drops approximately 9 feet each for attachment to the main coaxial cable and to the BNC connectors of a cluster adapter, two BNC T-connectors for attaching the cable drops to the main coaxial cable and two terminating plugs. Maximum: One. Customer Setup: Yes.

256KB Memory Expansion Option (#1209): Provides 256KB of parity-checked random access memory on a 5-inch card. Access time of the memory on the 256KB Memory Expansion Option card is 290ns and the cycle time is 840ns. This card can be installed in any expansion slot on the 5155 System Unit. For the 5155, this feature can be installed instead of the 64/256KB Memory Expansion Option with three 64KB Memory Module Kits to add to the 5155 at a lower cost and/or to be able to use a special-feature instead of a full-feature slot for the additional 256KB. Maximum: One with one 64/256KB Memory Expansion Option with 64KB or 128KB to provide 576KB or 640KB. Field Installation: Yes. Prerequisites: The 5155 must have 256KB installed on the system board as a prerequisite. Customer Setup: Yes.

Game Control Adapter (#1300): Provides support for two customer-supplied joysticks for video game interaction, allowing the user to move an object on the screen in any direction, or it supports up to four customer-supplied game "paddles" for simple horizontal or vertical movement. Maximum: One. Field Installation: Yes. Prerequisites: An available special or full-feature system expansion slot. Customer Setup: Yes.

Prototype Card (#1400): Professional engineers or hobbyists may utilize the Prototype Card as a base for building and testing custom attachments to the system. The Prototype Card is designed to plug into the 5155's long expansion slot. It is a full-size, high-quality circuit board. Circuitry and module holes are provided for interface with the bus. A bracket is included to secure the card in the 5155 with a cut-out provided for up to a 37-pin external connector. Detailed instructions and component identifications are included for I/O decode attachment logic. Technical Information: Physical dimensions -- 107mm (4.2") high x 335mm (13.2") long -- completely etched and drilled with plated-through holes -- preprinted circuitry for interface to bus -- attachment bracket and screws included -- block diagram and I/O decode logic description included. Field Installation: Yes. Prerequisites: An available system expansion slot. Customer Setup: Yes.

Data Acquisition and Control Adapter (#1502): Provides analog input and output channels and digital input and output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis, and quality control testing in laboratory, pilot plant, or full-scale production lines. The adapter provides four analog input channels with throughput to memory at 15,000 conversions per second, two analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of option for analog input and output channels, and programmed I/O mode for digital input and output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5155 unit. Maximum: Four. Customer Setup: Yes.

General Purpose Interface Bus Adapter (#1503): Provides an interface between an IBM Personal Computer and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multi-meters, and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300KB/second and programmed I/O data rate of up to 10KB/second. It allows the user to select interrupt level and memory access channels. Limitations: All adapters must be installed as a group in the system unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5155 unit for each adapter desired. Maximum: Four. Customer Setup: Yes.

Data Acquisition and Control Adapter Distribution Panel (#1504): Provides easy access to the I/O signals, voltages, and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34 inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with four barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change, or remove the instruments and/or control points being used. Field Installation: Yes. Prerequisites: An Adapter Acquisition and Control Adapter for each panel desired. Maximum: Four. Customer Setup: Yes.

Asynchronous Communications Adapter (#2074): Provides a channel to data processing or input/output devices outside of the immediate system. Such devices can be connected by telephone using a plug-in modem, or directly by cable when the device is nearby. The communication "target" may be a large host computer, a Series/1, another 5150/5155/5160, a paper tape reader, a communi-

cating typewriter, a laboratory instrument, or other machines providing the popular RS-232-C asynchronous interface. This adapter is flexible enough to match most of the computers and related products available in the microcomputer marketplace. The user's program selects the appropriate speed (50-9600 bps), format (5-, 6-, 7-, or 8-bit characters), parity and stop bits to reflect the attached device. Once communication has been established, the user's program performs reads and writes. Interrupts permit the program to perform data processing such as calculating, diskette reading or writing, or printing, and then pause to resume communications when a signal appears on the line. The adapter provides an EIA RS-232-C interface. One 25-pin "D" shell, male-type connector is provided to attach various peripheral devices. In addition, a current-loop interface is located in the same connector. A jumper block is provided to select manually either the voltage or the current-loop interface. Maximum: Two. Cable: A user-supplied communication cable is required for connection of external modems or other devices to the Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available special or full-feature system expansion slot is required. Customer Setup: Yes.

- Binary Synchronous Communications (BSC) Adapter (#1204):** The BSC Adapter when used with the BSC 3270 Emulation Program (6024037) can be used to emulate 3270 interactive BSC operation. The adapter provides the ability for a 5155 attached to a host system via communications lines to participate in a network using BSC protocol. The network may be either switched or nonswitched line. When used as a 3270 with the BSC 3270 Emulation Program, the 5155 operates as and appears to a host as one of the following 3270 devices:

3271 2/3277 2	Nonswitched line
3274 51C/3278 2	Nonswitched line
3275 2	Switched & nonsw line
3276 2	Nonswitched line

Technical Information: EIA RS-232-C interface -- operates at up to 9600 bps with switched or nonswitched line support -- provides modem control functions -- facilitates program controlled data transfer -- supports electrical wrap and error status reporting -- prioritized interrupt system controls. Limitations: Only one BSC Adapter may be installed if an SDLC Adapter is installed in the same system. Maximum: Two. Cable: The Communications Adapter Cable (#2067) allows the user to connect the BSC Adapter card to a modem via a plug at the rear of the 5155. The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available system expansion slot. Software such as the BSC 3270 Emulation Program is required for communication. An external modem must be cable-connected between the BSC Adapter and the telephone line. Customer Setup: Yes.

SDLC Communications Adapter (#2090): The SDLC Communications Adapter when used with the SNA 3270 Emulation and RJE Support Program (6024036) permits the 5155 to emulate 3270 interactive SNA operation or 3770 batch SNA. The adapter provides the ability for a 5155 attached to a host system via communications lines to participate in a network using SDLC protocol. When used as a 3270 with the SNA 3270 Emulation and RJE Support Program, the 5155 operates as and appears to a host as a 3278 mdl 2 attached to a 3274 mdl 51C. Technical Information: EIA RS-232-C interface -- operates at up to 9600 bps (up to 4800 bps when used with the SNA 3270 Emulation and RJE Support Program) with switched or non-switched line support (including multipoint) -- provides modem control functions -- facilitates program-controlled data transfer -- supports electrical wrap and error status reporting -- prioritized interrupt system controls. Limitations: Only one Asynchronous Communications Adapter may be installed if the SDLC Communications Adapter is installed. Maximum: One. Cable: The Communications Adapter Cable (#2067) allows the user to connect the SDLC Communications Adapter card to a modem via a plug at the rear of the 5155. The cable is double-shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available system expansion slot. Software such as the SNA 3270 Emulation and RJE Support Program (6024036) is required to allow communication. An external

modem must be cable-connected between the SDLC Communications Adapter and the telephone line. Customer Setup: Yes.

- Token-Ring Network PC Adapter Cable (#3390):** The 2.4m (8 ft) cable is used to attach the IBM Personal Computer with a network adapter to the Cabling System or directly to an access unit
- Token-Ring Network PC Adapter (#3391):** Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system and an attachment cable (#3390) for attaching to the Cabling System data grade media or a filter (available from cabling system distributors) for attaching to Cabling System Type 3 specified telephone media. Limitations: The adapter must be installed in the system unit and cannot be installed in the 5161 Expansion Unit.

Enhanced Display Station Emulation Adapter (#2871): Permits a 5155 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Model 12; or remotely via the 5294 Remote Control Unit to emulate a 5250 workstation. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 5155 can emulate a 5291 or 5292 display, and a 5256 or 5219 printer. One or two host sessions and one personal computer session can be active concurrently. Field Installation: yes. Prerequisites: An available full-feature slot in the 5155 unit. Maximum: One. Customer Setup: Yes.

Displaywriter/Personal Computer Attach Convenience Kit (#3728): Permits a Displaywriter system (without any communications features installed in the diskette unit) to be cable-connected to a 5155 via an Asynchronous Communications Adapter. The Compact Printer Connector Adapter (#0102) is also required. This attachment allows a Displaywriter to participate in a PC Cluster. When the Displaywriter is attached to a stand-alone 5155, the Displaywriter is used for operational control. Functions supported include transfer of documents and files between the Displaywriter and the 5155 including conversion of the document to reversible form text document content architecture (RFTDCA) prior to transfer to the 5155, and conversion from RFTDCA before transfer of documents to the Displaywriter. It is recommended that only DOS print files be transferred to the Displaywriter. Additional functions include the ability to display directories of the 5155 and Displaywriter, deletion of documents and files on either system unit, and an optional foreground execution facility which supports alternating between Displaywriter/Personal Computer Attach program functions and Textpack 4 or Textpack 6 functions. Limitations: Each user who is to share an application program on a PC Cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feather slot in the 5155 unit. Maximum: One. Customer Setup: Yes.

Color/Graphics Monitor Adapter (#4910): Provides for the attachment of a color display to the 5155. Either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5153 Color Display mdl 001, a video monitor, or through a customer-supplied RF modulator, a standard TV set. A color monitor or TV can be attached. 16 foreground and eight background colors are supported in text (character) mode. This attachment also provides support for 4-color medium resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 dots horizontal, 200 vertical). 256 characters are available in "text" mode, 128 in medium-or high-resolution graphics. The adapter provides 16KB of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Limitations: The primary monitor/display adapter is installed in the 5155 System Unit and not in the 5161 Expansion Unit. Maximum: One. Field Installation: Yes. Prerequisites: An available full system expansion slot. Customer Setup: Yes.

- IBM Token-Ring Network PC Adapter II (#5063):** Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter

handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS) and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitation: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

Printer Adapter (#5200): Provides for attachment of the 5152 Graphics Printer mdl 002. The adapter provides a connector for attachment of the printer cable to the rear of the 5155. Maximum: One. Cable: The Printer Cable (#5612) is available to connect the 5152 mdl 002 to the Printer Adapter. Field Installation: Yes. Prerequisites: A full-feature system expansion slot. Customer Setup: Yes.

Enhanced 5250 Emulation Installation Convenience Kit (#2870): This kit includes the Enhanced Display Station Emulation Adapter, Enhanced 5250 Emulation Program Version 2.1, integrated attachment cable, Keyboard Enhanced 5250 Emulation Program Version 2.1 template, and manuals necessary to install the Enhanced Display Station Adapter and Enhanced 5250 Emulation Program in the IBM Personal Computer.

Diagnostic Diskette (#2879): For Enhanced Display Station Emulation Adapter, Enhanced Display Station Emulation Adapter Installation and Problem Determination Manual and Enhanced Display Station Emulation Adapter Diagnostic Diskette (#2879). Allows connection of the 5155 to the S/34, S/36, or S/38 either locally through the work station controller or remotely via a 5251-12. The 5155 can also be connected remotely to the S/36 and S/38 via the 5294 Remote Control Unit. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot in the 5155 System Unit is required. The Integrated Attachment Cable (#2877) is required to attach the adapter to the twinax cable. Customer Set-up: Yes. For more information, refer to Product announcement 185-072 dated 6/18/85.

Integrated Attachment Cable (#2877): Required to permit attachment of the Enhanced Display Station Emulation Adapter to the twinaxial cables of the S/34, S/36, S/38, 5294 Remote Control Unit or 5251-12. Prerequisites: Enhanced Display Station Emulation Adapter. Maximum: One. Field installation: Yes.

Enhanced 5250 Emulation Program (#2873): When used with the Enhanced Display Station Emulation Adapter, the IBM Personal Computer can be attached to a S/34, S/36, or S/38 as a peripheral either locally via the workstation controller or remotely via the 5251-12. The IBM Personal Computer can also be attached to the S/36 or S/38 remotely via the 5294 Remote Control Unit. The IBM Personal Computer emulates a 5291 workstation and a 5256 Matrix Printer or 5219 Printer. The IBM Personal Computer in 5250 emulation mode has access to all functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The IBM Personal Computer can also function as a stand-alone personal computer.

Prerequisites:

- IBM Personal Computer Disk Operating System Version 1 Modification Level 1, Version 2 Modification Level 0, Version 2 Modification Level 1, Version 3 Modification level 0 or later compatible versions.
- Enhanced Display Station Emulation Adapter.
- At least 128KB of memory in the IBM Personal Computer.
- One available full feature system expansion slot.
- 5-1/4 inch double sided diskette drive (320K) and adapter or 5-1/4 inch diskette drive (1.2M) and adapter in IBM Personal Computer AT.

Highlights:

- Host Graphics Support, 5292-2 Subset: The Personal Computer emulates a subset of the function of the 5292-2 Display Station. To the IBM System/34, System/36, and System/38 Business Graphics Utility programs, the Personal Computer looks like a 5292-2. There is no Personal Computer graphics

printer support; output from the Business Graphics Utility programs can be directed to printers attached to the host. The Host Graphics Support, 5292-2 subset, will plot output on either the 7372 (6 pen) or 7371 (2 pen) plotters (or equivalent) attached to the Personal Computer via the Async port. For those who have written graphics orders directly from the System/34, System/36, or have used System/38 GDDM, should note that all orders are accepted and validated. Due to the differences in the PC hardware and the device drivers, different results may be displayed, or if the function is absent, result in a no-operation. Programmers should refer to the Technical Reference Manual, G570-2222.

System/38 GDDM and PGR support the Host Graphics Support, 5292-2 subset. Due to product hardware difference between the 5292-2 and the emulation, some graphic orders may be accepted, checked for validity, but have no function. Please check the Enhanced 5250 Emulation Program Version 2.1 Technical Reference, G570-2222.

• Table-Driven Printer Support: This enhancement provides 5256 or 5219 emulation for a variety of IBM Personal Computer printers and OEM printers, both parallel and serial. The user must provide a printer description table to the emulation program unless the printer model is found in the following table.

Note: IBM 5201 Quietwriter Printer (Model 001) is now supported as an emulated 5219 and 5256 printer.

5256 Emulation

IBM 5152 Matrix Printer (Model 001)
IBM 5152 Graphics (Model 002)
IBM 5182 Color Printer
IBM 5216 Wheelprinter (Model 001)
IBM 5201 Quietwriter Printer (Model 001)
IBM 4201 Proprinter Printer
NEC 3550 Spinwriter*

5219 Emulation

IBM 5182 Color Printer
IBM 5216 Wheelprinter (Model 001)
IBM 5201 Quietwriter Printer (Model 001)
NEC 3550 Spinwriter
* Trademark of NEC

One sample printer description table supporting 5256 emulation on a wide range of printers is provided. The user now has the flexibility to select from a large number of printers available for attachment to the IBM Personal Computer, and can choose the one that meets his/her needs.

- Serial Printer Attachments Support: This enhancement provides 5256 or 5219 emulation for a variety of IBM Personal Computer printers and OEM printers that are RS 232 compatible.
- Keyboard Enhancements:
 - Keystroke buffering (key ahead) or not
 - "Hot key" can be in keystroke playback string
 - Redefine the "hot key" to other keys instead of the "ALT-ESC"
 - Direct hot keying to emulated or DOS session
 - Printer session
 - Support keystroke playback string
 - Uses the customized layout
 - Playback string increased to 510

There is a program provided to convert Version 2.0 keyboard profiles to Version 2.1 keyboard profile.

- Additional Graphics Adapter Support: This enhancement provides 5292-2, subset emulation for the EGA and PGA graphics adapter.
- Allows the IBM Personal Computer to operate as a stand-alone personal computer or as a 5250 workstation and printer.
- Can be the only device on twinax line or intermixed with other displays and/or printers on the same line attached to the S/34, S/36, or S/38.
- Can be used like a 5291 or 5292-1 display and 5256 or 5219 printer.

- (selected countries > Can be used as the system console for the S/34 and S/36. <)
- Writes the contents of the display screen on an IBM Personal Computer printer if the IBM Personal Computer has a printer attached or can be directed to a host attached printer.
- Can be used as an alternate console on the S/34 or S/36.
- Allows concurrent access to the IBM Personal Computer Fixed Disk while the Enhanced 5250 Emulation Program is active.
- Provides the capability to establish two host sessions and one IBM Personal Computer session.
- Host sessions can be a single display session, a display session and a printer emulation session, or two display sessions.
- Uses "Hot Key" sequence to switch among sessions.
- The IBM Personal Computer printer can be used to emulate a 5256 Matrix Printer or IBM 5219 Printer.
- When the host sessions are not displayed on the IBM Personal Computer display, they remain active and continue processing the best application.
- The IBM Personal Computer session is active only when displayed on the IBM Personal Computer Display.
- Provides predefined keyboard configurations for a 5291 or IBM Personal Computer keyboard or allows the user to define the keyboard to satisfy his requirements.
- Allows the host work station addresses to be set by an IBM Personal Computer program. There are no physical switches for these functions.
- Automatic twinax termination with Integrated Attachment Cable. No on-card switch or termination plug required.
- Printer Emulation remains active while in IBM Personal Computer mode unless suspended by the operator.
- Virtual disk support when used with PC Support/36.
- Virtual diskette support when used with the File Support Utilities

Limitations:

- Magnetic stripe reader, selector light pen, and multinational character sets for 5250 family of displays are not supported.
- As a result of physical differences between displays, some information displayed on the 5291 and 5292 may appear differently on the IBM Personal Computer Display.
- The Enhanced 5250 Emulation Program will work with most IBM Personal Computer Programs. However, programs that overlay the emulator, that use the same interrupt level, that use Virtual Device Interface (VDI) Host Graphics support are sensitive to the address at which they are loaded may not be compatible. Interrupt Level 5 is used by the Enhanced Display Station Emulation Adapter and may not be modified.
- When using the Enhanced 5250 Emulation Program Version 2.1 with the IBM Personal Computer-System/36 Transfer Facility PRPQ or the IBM Personal Computer-System/38 Transfer Facility PRPQ users must ensure that they sign onto the system before executing the Transfer Facility programs.
- Communications on the PC cannot be active when using the Enhanced Graphics Adapter (EGA) and/or Voice Communication Option Asynchronous Data Communication, Function Set. The Host Graphics Support, 5259 subset, will plot output to plotters attached to the IBM Personal Computer via the async port.
- Communication may be active with the Color Graphic Adapter (CGA) or the Professional Graphics Controller (PGC).
- To display graphics data in the host graphics session, the DOS session must be dedicated to the GR5250.COM program. This is accomplished by running the GR5250.COM program in the DOS session. The DOS session can be readily made available at any time for user's program(s) by terminating the GR5250.COM program.
- The 5219 printer emulation does not have dual drawer selection support.

Configuration Requirements on the S/34/36/38:

- The IBM Personal Computer with the Enhanced Display Station Emulation Adapter and Enhanced 5250 Emulation Program may be attached to any mdl of the S/34, S/36, or S/38 that is not already fully configured with the maximum permissible number of workstations.
- Maximum: The maximum number of IBM Personal Computers that can be attached locally to the S/34, S/36 and S/38 is the

same as the maximum number of workstations allowed on each system.

- IBM Personal Computers may be intermixed with other 5250 work stations and work station printers up to the combined total of seven IBM Personal Computers, work stations and/or work station printers per cable port as a distance of up to 1524 meters from the system. Cable-through is supported via the Integrated Attachment Cable (#2877).
- Remote attachment of more than one IBM Personal Computer in a single location requires a 5251-12 with a cluster or dual cluster feature or a 5294 Remote Control Unit.

Packaging: The Enhanced 5250 Emulation Program (#2875) consists of a user's guide, a 5-1/4 inch double sided diskette (320K) containing the emulation program, display station status stick-on labels, and keyboard templates.

Remote 5250 Emulation Program (#2874): The Remote 5250 Emulation Program allows a single IBM Personal Computer to emulate a 5294 Remote Control Unit with an IBM Personal Computer emulating a 5291 or 5292-1 work station and/or work station printer attached over a communication line to a S/36 or S/38. The IBM Personal Computer in IBM 5250 emulation mode has access to all functions of the host system available to a display station operator, providing the use with the power of the S/36 or S/38. The IBM Personal Computer can also operate a stand-alone personal computer.

Prerequisites:

- IBM Personal Computer Disk Operating System (DOS) Version 2 Modification Level 0, Version 2 Modification Level 1, Version 3 Modification Level 0, or later compatible versions.
- SDLC Communication Adapter (1502090) and Communications adapter cable (1502067).
- At least 256KB of memory in the IBM Personal Computer.
- 5-1/4 inch double sided diskette drive (320K) and adapter or 5-1/4 inch diskette drive (1.2M) and adapter in IBM Personal Computer AT.

Highlights:

- Allows the IBM Personal Computer to operate as a stand-alone personal computer or as a 5250 work station and printer in a remote environment.
- Can be used like a 5291 or 5292-1 display and 5256 or 5219 printer.
- Writes the contents of the display screen on an IBM Personal Computer printer if the IBM Personal Computer has a printer attached or can be directed to a host attached printer.
- Allows concurrent access to the IBM Personal Computer Fixed Disk while the IBM Personal Computer Remote 5250 Emulation Program is active.
- Provides the capability to establish two host sessions and one IBM Personal Computer session.
- Host sessions can be a single display session, a display session and a printer emulation session, or two display sessions.
- Uses "Hot Key" sequence to switch among sessions.
- The IBM Personal Computer printer can be used to emulate a 5256 Matrix Printer or 5219 Printer.
- When the host sessions are not displayed on the IBM Personal Computer display, they remain active and continue processing the host application.
- The IBM Personal Computer session is active only when displayed on the IBM Personal Computer Display.
- Provides predefined keyboard configurations for a 5291 or IBM Personal Computer keyboard or allows the user to define the keyboard to satisfy his requirements.
- Printer Emulation remains active while in IBM Personal Computer mode unless suspended by the operator.
- Virtual disk support when used with PC Support/36.
- Virtual diskette support when used with the File Support Utilities.

Limitations:

- Magnetic stripe reader, selector pen, and multinational character sets for 5250 family of displays are not supported.

- As a result of physical differences between displays, some information displayed on the 5291 and 5292 may appear differently than on the Personal Computer display.
- The Enhanced 5250 Emulation Program will work most IBM Personal Computer programs. However, programs that overlay the emulator, that use the same interrupt level, that use Virtual Device Interface (VDI) Host Graphics Support or are sensitive to the address at which they are loaded, may not be compatible. Interrupt Level 5 is used by the Enhanced Display Station Emulation Adapter and may not be modified.
- When using the Enhanced 5250 Emulation Program Version 2.1 with the Personal Computer-System/36 Transfer Facility PRPQ or the Personal Computer-System/38 Transfer Facility PRPQ, users must ensure that they sign onto the system before executing the Transfer Facility Program.
- Communications on the PC cannot be active when using the Enhanced Graphics Adapter (EGA) and/or Voice Communication Option Asynchronous Data Communication, Function Set. The Host Graphics Support, 5292 subset, will plot output to plotters attached to the IBM Personal Computer via async port.
- Communication may be active with the Color Graphic Adapter (CGA) or the Professional Graphics Controller (PGC).
- To display graphics data in the host graphics session, the DOS session must be dedicated to the GR5250.COM program. This is accomplished by running the GR5250.COM program in the DOS session. The DOS session can be readily made available at any time for user's program(s) by terminating the GR5250.COM program.
- The 5219 printer emulation does not have dual drawer selection support.
- Because of the physical differences between displays, some information displayed on the 5291 and 5292-1 may appear differently on the IBM Personal Computer Display (e.g., The IBM Personal Computer does not support an identical character set with the 5250, the color adapter does not support under-scoring, column separators are different, and color on the color monitors is different.

- The Remote 5250 Emulation Program will work with most IBM Personal Computer programs. However, there are some programs that may not be compatible, such as a program that overlays the emulator, a program that supports the same interrupt level or a program that is sensitive to the address it is loaded at in IBM Personal Computer storage.
- The Remote 5250 Emulation Program does not support the Text Entry Assist feature or download feature of the 5294 Remote Control Unit.
- The Remote 5250 Emulation Program does not support clustering of work stations.

Model Conversion: None.

Configuration Requirements on S/36/38: The S/36 and S/38 must have the appropriate communications adapter installed. See the machine sections of the S/36 and S/38 for the communication features.

Packaging of the Remote 5250 Emulation Program: The Remote 5250 Emulation Program (#2874) consists of a user's guide, two 5-1/4 inch double sided diskettes (320K) with the remote emulation program, display station status stick-on labels, and keyboard templates.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

Contact IBM.

5160 PERSONAL COMPUTER XT

THERE IS MORE THAN ONE TEXT VERSION FOR THIS DOCUMENT

PURPOSE

The 5160 Personal Computer XT is an intelligent workstation which provides an extension of function and flexibility over the 5150 Personal Computer. Support is offered to a variety of operating systems and programming languages. This strategic information processing machine also provides connection to a wide variety of IBM data processing and office automation systems. Such connection allows the 5160 user to take advantage of the additional computing power, communications, mass storage, high-speed printing, application software and data bases provided by the host system. Software is available to allow stand-alone use for applications such as personal and professional decision-making support, work processing, computer-based training, business accounting, and home entertainment as well as the support of connection and interchange with host systems. Additional connectivity is provided through 5160 participation in a PC Local Area Network. The XT/370 operates as a standard XT and additionally as S/370 intelligent workstation allowing execution of many S/370 programs (up to 4Mb virtual) as well as the capability of the standard XT to attach coaxially to 3270 family controllers (with the use of an optional 3278/79 Emulation Adapter #2507).

MODELS (CANADA ONLY > 068, 078, 086, 087, 470, AND 589

See description for Models (Canada only > 088, 089, 267, 268, 277 and 278 <) later in these pages.

Model 068: (NO LONGER AVAILABLE) System Unit/Keyboard, 256Kb Memory, 1 5.25-Inch Double-Sided Diskette Drive, 5.25-Inch Diskette Drive Adapter.

Model 078: (NO LONGER AVAILABLE) System Unit/Keyboard, 256Kb Memory, 2 5.25-Inch Double-Sided Diskette Drives, 5.25-Inch Diskette Drive Adapter.

Model 086: (NO LONGER AVAILABLE) System Unit/Keyboard, 256Kb Memory, 10Mb Fixed Disk Drive, Fixed Disk Drive Adapter, 1 5.25-Inch Double-Sided Diskette Drive, 5.25-Inch Diskette Drive Adapter, Asynchronous Communications Adapter.

Model 087: (NO LONGER AVAILABLE) System Unit/Keyboard, 128Kb Memory, 10Mb Fixed Disk Drive, Fixed Disk Drive Adapter, 1 5.25-Inch Double-Sided Diskette Drive, 5.25-Inch Diskette Drive Adapter, Asynchronous Communications Adapter.

Model 470: System Unit, 256Kb Memory on system board, 1 5.25-Inch 320Kb Diskette Drive and Adapter, Financial Input Adapter, and the Finance 107-Key Administrative Keyboard.

Model 589: (NO LONGER AVAILABLE) System Unit/Keyboard, 256Kb Memory, PC/370-M Card (512Kb Memory), PC/370-P Card (370 Processor), 3278-79 Emulation Adapter (1602507), 10Mb Fixed Disk Drive, Fixed Disk Drive Adapter, 1 5.25-Inch Double-Sided

Diskette Drive, 5.25-Inch Diskette Drive Adapter, Asynchronous Communications Adapter.

Prerequisites: Attachment of 1 of the following display options:

- A 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900).
- A 5153 Color Display and either the Color/Graphics Monitor Adapter (#4910) or the Enhanced Graphics Adapter (#1200).
- A 5154 Enhanced Color Display and either the Color/Graphics Monitor Adapter (#4910) or the Enhanced Graphics Adapter (#1200).
- A 5175 Professional Graphics Display and the Professional Graphics Controller (#1501).
- A user-supplied direct-drive color or black and white video monitor (not applicable to the XT/370 model), or a user-supplied color or black and white television set with an RF modulator, and either the Color/Graphics Monitor Adapter (#4910) or the Enhanced Graphics Adapter (#1200).
- For the 5160 Model 589 (XT/370), a user-supplied coaxial cable to attach to a 3274 Control Unit and a 5161 Model 003 or equivalent.

Customer Setup (CSU): All models and special features of the 5160 Personal Computer XT are customer setup.

HIGHLIGHTS

- The 5160 Personal Computer XT System Unit is a table-top unit which houses the high-performance microprocessor.
- The 5160 contains 8 option (feature) slots. These slots allow the addition of feature cards to support additional features or memory. 6 of these slots are full-feature slots that will accept full-size feature cards. The remaining 2 are special-feature slots, 1 of which is designed to accept only the Asynchronous Adapter Card. The special-feature slot will fit most smaller feature cards.
- The following features are supplied as standard with the 5160:
 - 93-key keyboard (except for Model 470)
 - 8 system expansion slots (1 slot is required for a display adapter; 1 is used for the 5.25-Inch Diskette Drive Adapter, and 1 which is available only for the Asynchronous Adapter Card, standard on all models except the Model 068 and 078 where this card is optional)
 - Intel 8088 Microprocessor
 - 40Kb read-only memory:
 - Enhanced version of BASIC-80 Interpreter.
 - Built-in power-on self-diagnostic testing.
 - 5.25-Inch 320Kb Diskette Drive and Adapter (formatted capacity of up to 360Kb)
 - 130 watt power supply with cooling fan
 - Programmable speaker which can be used to produce tones
- The following table shows the slot utilization and memory on the system board for the 5160 models:

Slot No.	Type	Models					Description
		068	078	086	087	689	
1	Full	open	open	open	open	open	Recommended for Prerequisite Display Adapter
2	Full	open	open	open	open	open	Recommended for 3278/79 Emulation Adapter (#2507) in XT/370 models if Host Session desired
3	Full	open	open	open	open	used	PC/370-M Card (512Kb Memory)
4	Full	open	open	open	open	used	PC/370-P Card (370 Processor)
5	Full	open	open	used	used	used	Fixed Disk Drive Adapter

MACHINES

6	Full	used	used	used	used	
7	Spec.	open	open	open	open	
8	Spec.	open	open	used	used	
		256	256	256	128	256

5.25-Inch Diskette Adapter
For smaller Feature Cards
Asynchronous Communications
Card only (optional on models
068 and 078)
Kb Memory on XT system board

- Additional memory increments of 64Kb are available (unnecessary in Model 470, or on XT/370, or on base XT with XT/370 Option Kit installed). 2 additional memory increments can be installed on the system board and the remainder on expansion options (feature cards). The 5160 supports user memory up to a maximum of 640Kb in Personal Computer mode but only 480Kb in XT/370 mode. The 5160 with Financial Output Adapter installed supports user memory up to a maximum of 576Kb.
 - Further expansion is available with a 5161 Expansion Unit. The 5161 Model 002 is used as an expansion unit for the 5160 Models 068, 078, 086, 087, or 589. The 5161 Model 003 is used as an expansion unit for the 5160 Model 589. The 5161 Model 003 contains 2 additional 10Mb Fixed Disk Drives and Fixed Disk Drive Adapter. The 5161 Model 002 contains an additional 10Mb Fixed Disk Drive and 8 additional option slots. Upon installing the Expansion Unit, the Fixed Disk Drive and Fixed Disk Drive Adapter in the 5160 may be moved to the 5161 for a total of 20Mb (2 10Mb Fixed Disk Drives) in the Expansion Unit. An additional diskette drive may then be installed in the 5160, resulting in a maximum configured system of 20Mb Fixed Disk, 720Kb diskette, and 640Kb user memory. When the Expansion Unit is attached to the 5160, 1 slot in each unit is occupied by an attachment card.
 - Some of the options available for the 5160 Personal Computer XT include:
 - Attachment of the 5161 Expansion Unit Model 002 for increased storage capacity and additional configuration flexibility
 - The XT/370 Option Kit for execution of S/370 programs
 - 4 IBM display options including:
 - ▲ 5151 Monochrome Display
 - ▲ 5153 Color Display
 - ▲ 5154 Enhanced Color Display
 - ▲ 5175 Professional Graphics Display
 - Financial Options
 - Printer options including:
 - ▲ 3852-2 Color Jetprinter
 - ▲ 3812 Pageprinter
 - ▲ 4971 Graphics Printer
 - ▲ 5218 Printer Models A03/A04
 - Highlights of the BASIC-80 Interpreter include:
 - Full screen editor for easy program creation and modification
 - Select 40- or 80-character display lines
 - Up to 16 foreground and 8 background colors (with appropriate monitor and adapter)
 - Automatic line numbering
 - 40-character variable names (all characters significant)
 - 250 characters per program line
 - Comments on program lines
 - Up to 17-digit numeric precision
 - Error trapping
 - Addressable workspace to 60Kb
 - Integer/real/string variables
 - Single- and double-precision floating point numbers
- Publications:**
- "IBM Personal Computer XT Technical Reference" (NO LONGER AVAILABLE) (#6808): This manual is written to provide hardware design and interface information. The publication also provides Basic Input Output System (BIOS) information as well as programming support material. The manual is intended for programmers, engineers involved in hardware and software design, designers, and interested persons who have a need to know how the IBM Personal Computer XT is designed and works.
 - "IBM Personal Computer XT/370 Technical Reference" (#6732): (NO LONGER AVAILABLE) This manual is written as a supplement to the XT manual (#6808) for similar audience and used to provide hardware design and interface information on the XT/370.
 - "IBM Personal Computer 3278/79 Emulation Adapter Technical Reference Manual for the Advanced Adapter Addendum" (#6575): Provides detailed information about the IBM Personal Computer 3278/79 Emulation Adapter (#5050) for users of the "IBM Personal Computer XT Technical Reference Manual" (#6808).
 - IBM Personal Computer XT Hardware Maintenance and Service (#6809): (NO LONGER AVAILABLE) This manual provides step-by-step instructions to aid the user in identifying the failure of an IBM Personal Computer XT Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the necessary information to complete the repair activity (i.e., adjustments, replacements, etc.).
 - "IBM Personal Computer XT/370 Hardware Maintenance and Service" (#6731): (NO LONGER AVAILABLE) This manual provides step-by-step instructions to aid the user in identifying the failure of an IBM Personal Computer XT/370 Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the necessary information to complete the repair activity (i.e., adjustments, replacements, etc.). This manual supplements the "XT Hardware Maintenance and Service Manual" (#6809).
 - "IBM Personal Computer 3278/79 Emulation Adapter Hardware Maintenance and Service Manual Addendum" (#6585): This addendum to the "IBM Personal Computer XT Hardware Maintenance and Service Manual" provides detailed maintenance information about the 3278/39 Emulation Adapter (#5050) for users of the "IBM Personal Computer XT Hardware Maintenance and Service Manual" (#6809). Also contains diagnostic diskette.
 - "Enhanced Display Station Emulation Adapter Hardware Technical Reference Manual" (G570-2225). This manual provides maintenance information for an Enhanced Display Station Emulation Adapter (#2871) used with the Enhanced 5250 Emulation Program (#2872). This manual will enable the customer to perform problem diagnosis to the Field Replaceable Unit (FRU) level.
 - "Display Station Emulation Adapter Hardware Maintenance and Technical Reference Manual Version 2.0" (#2883): This manual provides maintenance information for a Display Station Emulation Adapter (#2887) used with the 5520/Personal Computer Attachment Program Version 2.0 (#2884). This manual will enable the customer to perform problem diagnosis to the Field Replaceable Unit (FRU) level.
 - "Display Station Emulation Adapter Hardware Maintenance Manual" (#2889): This manual provides maintenance information for a Display Station Emulation Adapter (#2887) used with the 5520/Personal Computer Attachment Program Version 1.0 (#2888) or the Personal Computer 5250 Emulation Program (#2885). This manual will enable a customer to perform problem determination to the Field Replaceable Unit (FRU) level.
 - "IBM 4700 Personal Computer Hardware Maintenance and Service" (6361605): Provides step-by-step instructions that aid the user in identifying the failure of an IBM 4700 Personal Computer Financial Option Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the

necessary information to complete the repair activity (i.e., adjustments, replacements, etc.).

Physical Specifications:

Height: 142mm (6 in.)
Width: 500mm (20 in.)
Depth: 410mm (16 in.)
Weight (Approximate): 14.5kg (32 lbs)

SPECIFY (NONE)

SPECIAL FEATURES

PC Network Adapter (#0213): Allows the 5160 to be connected to form an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at a 2M bps. Each PC in the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor, an Intel 82586 network controller, a fixed-frequency modem, and network microcode that offloads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75M Hz transmit frequency and a 219M Hz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The Network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network Adapter is provided with a 9-foot cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1,000 feet from the 5178 unit. Limitations: Each user who is to share an application program on a PC Network must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit; DOS Version 3.1 or later if the PC Network Program is to be used. Maximum: 1. Customer Setup: Yes.

PC Network Base Expander (#0230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to 8 Short Distance Kits, Medium Distance Kits, and/or Long Distance Kits in any combination to further extend the distance between the PC with the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

PC Network Short Distance Kit (#0231): Provides 1 foot of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Medium Distance Kit (#0232): Provides 2x60m (400 feet) of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitation: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Long Distance Kit (#0233): Provides 4x60m (800 feet) of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 7.5m (25 ft) Cabling Segment (#0234): Provides 7.5m (25 ft) of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with 1 of the PC Network Distance Kits. Limitations: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 15m (50 ft) Cabling Segment (#0235): Provides 15m (50 ft) of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with 1 of the PC Network Distance Kits. Limitations: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 30m (100 ft) Cabling Segment (#0236): Provides 30m (100 ft) of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with 1 of the PC Network Distance Kits. Limitations: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 60m (200 ft) Cabling Segment (#0237): Provides 60m (200 ft) of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with 1 of the PC Network Distance Kits. Limitations: A maximum of 8 PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Transformer Unit (#0238): Is packaged separately from the 5178 PC Network Translator Unit, however, it is required for the operation of the 5178 PC Network Translator Unit and is a 120-volt transformer which plugs into a standard grounded outlet. Field Installation: Yes. Customer Setup: Yes.

Personal Computer Voice Communications Operating Subsystem (#0708): This feature enables the same PBX/CBX functions, and to recognize signals on a telephone line such as touch-tone and off-hook. Applications issue function calls to this subsystem program through an application program interface. This is defined in the "IBM Personal Computer Voice Communications Application Program Interface Reference".

Math Co-Processor Option (#1002): Provides for the addition of the Intel 8087 Processor as a companion to the Intel 8088 to increase speed and precision in arithmetic, logarithmic, and trigonometric functions. The Option Kit provides a matched Intel 8088 along with the Intel 8087 to ensure high performance. The Intel 8087 multiplies 32-bit and 64-bit floating point numbers approximately 80 times faster than the Intel 8088. This option is supported only by IBM Personal Computer APL and by the Macro Assembler "escape" instruction. Maximum: 1. Field Installation: Yes. The customer is responsible for ensuring that the Math Co-Processor Option is installed by a technically skilled person. It is recommended that IBM or an IBM-authorized Personal Computer Dealer install this option.

64Kb Memory Module Kit (#1003): (Unnecessary in Model 589 or when XT/370 Option Kit is installed). Provides a 64Kb increment of parity-checked random access memory which may be plugged into sockets on the 5160 system board or the 64/256Kb Memory Expansion Option (#1013). The 64Kb Memory Module Kits are sold as small, plug-in circuits with instructions for user installation. Maximum: Up to 2 64Kb Memory Module Kit increments may be customer-installed on the system board, to provide an additional 128Kb of memory. The 64/256Kb Memory Expansion Option provides 64Kb of memory as standard. Up to 3 64Kb Memory Module Kit increments may be customer-installed on a 64/256Kb Memory Expansion Option, to provide an additional 192Kb of memory. Field Installation: Yes. Prerequisites: Available sockets on the 5160 system board, or available sockets on a 64/256Kb Memory Expansion Option. Customer Setup: Yes.

64/256Kb Memory Expansion Option (#1013): (Unnecessary in Model 589 or when XT/370 Option Kit is installed). Increments sys-

tem memory by 64Kb (65,536 bytes) and is easily expandable to 256Kb by plugging in additional increments of 64Kb with 64Kb Memory Module Kits (#1003). The 64/256Kb Memory Expansion Option is packaged as a circuit card designed to plug into 1 of the 5160's full-feature system expansion slots. Technical Information: Random access memory -- starting address is set by switches -- 250ns access time -- 410ns memory cycle time -- parity checking -- sockets for expansion to 256Kb. Limitations: The 5160 supports a maximum addressable memory of 640K bytes. The combination of the 256Kb installed on the system board, and any installed 64/256Kb Memory Expansion Options, and 64Kb Memory Module Kits, must not exceed a total of 640Kb of memory. The 64/256Kb Memory Expansion Option must be installed in the 5160 System Unit and not in a 5161 Expansion Unit. Maximum: 2. Field Installation: Yes. Prerequisites: The system board must have 256Kb of memory installed before adding any additional memory via memory expansion options. An available full-feature system expansion slot is required for each 64/256Kb Memory Expansion Option. Customer Setup: Yes.

Keyboard (#1100): (NO LONGER AVAILABLE) The keyboard (standard on the 5160 Models 087 and 589) is attached to the 5160 with a 1.8m (6 ft) coiled cable, permitting adaptation to a variety of work environments. The 83-key keyboard, with an adjustable typing angle, offers commonly-used data and word processing functions in a design that combines the familiar typewriter and calculator pad layouts. All non-control keys are typamatic (repeating). 10 program-supported function keys (total of 40 possible functions using keyboard shift keys) are standard. Special symbols, such as those used to draw lines, may be accessed with a combination of keys. Depending on the application program, from 10 to 40 special function keys may be supported. Other keys, like those used to print the current screen contents, correct a typing error, or "scroll" a long document, are clearly labeled. Access to all 256 characters (ASCII and special) is provided by the use of the ALT key. The keyboard is plugged directly into the 5160. The approximate dimensions of the keyboard are: 57mm (2.5 in.) height, 500mm (20 in.) width, 200mm (8 in.) depth. The approximate weight is 2.8kg (6 lbs). Maximum: 1. Field Installation: Yes. Customer Setup: Yes.

Enhanced Graphics Adapter (#1200): Provides a 9-pin connector on the end of the card for a display that presents a direct-drive RGB (Red, Green, Blue) signal. This Adapter contains 64Kb of graphics memory. It supports 4 colors at a resolution of 640 pels x 350 pels, an 8 x 14 character box for color text, and 256 characters in text mode. A character generator can be loaded from RAM to allow any set of 256 characters to be used. 1 light-pen can be attached to this adapter in addition to 1 display via the P-2 connector (6-pin Berg strip on the side of the card). This adapter provides support for 1 of the following: 5154 Enhanced Color Display, 5151 Monochrome Display, 5153 Color Display or another direct-drive display. 2 modes are supported by the Enhanced Graphics Adapter - the enhanced mode which is required for the 5154 Display if it fits 640 x 350 resolution and selection from up to 64 colors are to be used and - the enhanced display emulation mode which supports the 5151, 5153, and 5154 displays and all the modes provided by the Monochrome Display and Printer Adapter (plus the addition of an all-points-addressable graphics mode for the 5151 Display that is not provided by the Monochrome Display and Printer Adapter) and the Color/Graphics Adapter (plus certain graphics support for the 5153 Display that is not provided by the Color/Graphics Adapter (16 colors for 40 columns in 320 x 200 resolution and 16 colors for 80 columns in 640 x 200 resolution). Limitations: Composite video support for the attaching analog monitors or TV sets is not provided. A light-pen is not supported when the Enhanced Graphics Adapter is used with the 5151 Display. This Adapter cannot be installed in the 5161 Expansion Unit. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Graphics Memory Expansion Card (#1201): Provides 64Kb of graphics memory for a total of 128Kb on the Enhanced Graphics Adapter to support up to 16 colors at the 640 x 350 resolution and up to 512 text characters. With the Graphics Memory Module Kit (#1203), the Enhanced Graphics Adapter (#1200), with the Graphics Memory Expansion Card will support up to 1,024 characters (up to 8 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially

through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (#1200) plus any prerequisites of that feature. Maximum: 1. Customer Setup: Yes.

Graphics Memory Module Kit (#1203): Provides 128Kb of graphics memory for a total of 256Kb on the Enhanced Graphics Adapter (#1200), with the Graphics Memory Expansion Card (#1201) to support up to 1,024 characters (up to 8 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (#1200), with the Graphics Memory Expansion Card (#1201) plus any prerequisites of those feature. Maximum: 1. Customer Setup: Yes.

Binary Synchronous Communications (BSC) Adapter (#1204): The BSC Adapter when used with the BSC 3270 Emulation Program (6024037) can be used to emulate 3270 interactive BSC operation. The adapter provides the ability for a 5160 attached to a host system via communications lines to participate in a network using BSC protocol. The network may be either switched or nonswitched line. When used as a 3270 with the BSC 3270 Emulation Program, the 5160 operates as and appears to a host as 1 of the following 3270 devices:

3271 Model 2/3277 Model 2 -- Nonswitched line
 3274 Model 51C/3278 Model 2 -- Nonswitched line
 3275 Model 2 -- Switched and nonswitched line
 3276 Model 2 -- Nonswitched line

Technical Information: EIA RS-232-C interface -- operates at up to 9600 bps with switched or nonswitched line support -- provides modem control functions -- facilitates program controlled data transfer -- supports electrical wrap and error status reporting -- prioritized interrupt system controls. Limitations: Only 1 BSC Adapter may be installed if an SDLC Adapter is installed on the same system. Maximum: 2. Cable: The Communications Adapter Cable (#2067) allows the user to connect the BSC Adapter card to a modem via a plug at the rear of the 5160. The cable is double-shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Software such as the BSC 3270 Emulation Program is required for communication. An external modem must be cable-connected between the BSC Adapter and the telephone line. Customer Setup: Yes.

SDLC Communications Adapter (#1205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only 1 SDLC Adapter may be installed. Customer Setup: Yes.

Cluster Adapter (#1206): (NO LONGER AVAILABLE) Permits the 5160 to be included in a cluster of interconnected personal computers which can include the 4860, 5150, 5155, 5160, 5170, XT/370, AT/370, and 5531 Industrial PC. The clustered IBM Personal Computer configuration utilizes baseband signaling and carrier sense multiple access with collision avoidance (CSMA/CA) access protocol. The topology of the interconnection is a bus environment using 75-ohm coaxial cable. The data transmission is 375K bps. The Cluster Program is provided to support up to 64 PCs in a clustered configuration. This program permits small work groups in schools and businesses to exchange messages and data files and optionally to share a fixed disk that contains programs. Messages and files can be transferred between any 2 PCs in the cluster and a message can be broadcast from 1 PC to all other PCs in the cluster. When a fixed disk is to be shared, the PC in the cluster with the fixed disk must be designated as a disk server. When a disk server PC is defined, a download option is made available which will permit downloading DOS, the cluster program, and an application program from the disk server PC to a remote PC in the cluster when the remote computer is powered on. Limitations: Each user who is to share an application program on a cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit; DOS Version 2.1 or later. If the 5160 is designated as the disk server computer, it must have 256Kb of memory and 1 fixed disk. The cluster program requires a maximum of 29Kb of resident memory except when the PC is utilized as a disk server when a maximum of 136Kb of memory is required. DOS re-

quirements must be added to the cluster program size to determine the memory available for application programs. Maximum: 1. Customer Setup: Yes.

Cluster Cable Kit (#1207): Is used to interconnect the first 2 PCs in an IBM PC cluster and attaches to the Cluster Adapter (#1206). Each PC in the cluster after the first 2 also requires a cluster cable kit. The Cluster Cable Kit provides a main coaxial cable bus of approximately 10m (32 ft), 2 cable drops approximately 3m (9 ft) each for attachment to the main coaxial cable and to the BNC connectors of a cluster adapter, 2 BNC T-connectors for attaching the cable drops to the main coaxial cable and 2 terminating plugs. Maximum: 1.

256Kb Memory Expansion Option (#1209): Provides 256Kb of parity-checked random access memory on a 5-inch card. Access time of the memory on the 256Kb Memory Expansion Option card is 290ns and the cycle time is 840ns. This card can be installed in any full-feature slot or special-feature slot 7 on the 5160 System Unit. For the 5160, this feature can be installed instead of the 64/256Kb Memory Expansion Option with 3 64Kb Memory Module Kits to add 256Kb to the 5160 at a lower cost and/or to be able to use a special-feature instead of a full-feature slot for the additional 256Kb. Limitations: This memory cannot be installed in slot 8 in the 5160 unit or in any slot in the 5161 unit. Maximum: 1 with 1 64/256Kb Memory Expansion Option with 64Kb or 128Kb to provide 576Kb or 640Kb. Field Installation: Yes. Prerequisites: The 5160 Model 87 must have 256Kb installed on the system board as a prerequisite. Customer Setup: Yes.

(Except LAD> IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3m coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <

(Except LAD> IBM PC Network Adapter II supports US English and National Languages for UK English, French, German, Italian, and Spanish. <)

- (Except LAD> A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC. Supports Remote Initial Program Load (RIPL). <
- (Except LAD> National Language Support for English, German, French, Spanish, and Italian. <)

(Except LAD> Specified Operating Environment

- Machine requirements: IBM PC Network Adapter II requires a full-size adapter slot in 1 of the following system units:
 - IBM 8530 Personal System/2 Model 30
 - IBM 5150 Personal Computer
 - IBM 5160 Personal Computer XT
 - IBM 5170 Personal Computer AT
 - IBM 5162 Personal Computer XT/286
- Programming requirements:
 - IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).

- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

(Except LAD> IBM PC Network Baseband Adapter (#1221, P/N 1501221): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30 (8530).

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power-On Self-Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to 8 workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to 10 daisy chains with 8 workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <

(Except LAD> IBM PC Network Baseband Adapter supports US English and National Languages for UK English, French, German, Italian, and Spanish. <)

- (Except LAD> A feature card for IBM Personal System/2 Model 30 and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.
- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than 8 nodes. <
- (Except LAD> National Language Support for English, German, French, Spanish, and Italian. <)

(Except LAD> Specified Operating Environment

- Machine Requirements

IBM PC Network Baseband Adapter requires a full-size adapter slot in 1 of the following system units:

- IBM 8530 Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286
- Programming requirements:
 - IBM LAN Support Program (P/N 83X7873).
 - IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
 - IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

Game Control Adapter (#1300): Provides support for 2 customer-supplied joysticks for video game interaction, allowing the user to move an object on the screen in any direction, or it supports up to 4 customer-supplied game "paddles" for simple horizontal or vertical movement. Maximum: 1. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature system expansion slot. Customer Setup: Yes.

Prototype Card (#1400): Professional engineers or hobbyists may utilize the Prototype Card as a base for building and testing custom

attachments to the system. The Prototype Card is designed to plug into 1 of the 5160's full-feature expansion slots. It is a full-size, high-quality circuit board. Circuitry and module holes are provided for interface with the IBM bus. A bracket is included to secure the card in the 5160 with a cut-out provided for up to a 37-pin external connector. Detailed instructions and component identifications are included for I/O decode attachment logic. Technical Information: Physical dimensions: 107mm (4.2 in.) high x 335mm (13.2 in.) long -- completely etched and drilled with plated-through holes -- pre-printed circuitry for interface to IBM bus -- attachment bracket and screws included -- block diagram and I/O decode logic description included. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Professional Graphics Controller (#1501): Is required to attach the 5175 Professional Graphics Display to a 5160. The 5175 Display together with the Professional Graphics Controller offers more colors and a higher resolution than the 5154 Enhanced Color Display with the Enhanced Graphics Adapter and provides high-quality color graphics capabilities for a wide range of specialized applications. The Professional Graphics Controller provides 2 modes: Expanded graphics for full support of the 5175 Professional Display and Color/Graphics Monitor Adapter emulation. It offers 640 x 480 resolution for expanded graphics mode and 640 x 400 for emulation mode as well as 256 colors from a palette of 4,096 for expanded graphics mode. There is built into the Controller 2-dimensional and 3-dimensional capability for drawing, rotating, translating and scaling. An Intel 8M Hz, 8088 microprocessor is provided for high-performance graphics operations and the Controller provides 320Kb of display storage. Additionally, the controller has 64Kb of graphics microcode that reduces the need to load software routines to support key graphics activities. Limitations: When the Professional Graphics Controller is installed together with the Color/Graphics Monitor Adapter, the Professional Graphics Controller must operate in expanded graphics mode. Prerequisites: 2 adjacent full-feature slots in the 5160 or 5161 unit. Maximum: 1. Customer Setup: Yes.

Data Acquisition and Control Adapter (#1502): Provides analog input and output channels and digital input and output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis, and quality control testing in laboratory, pilot plant, or full-scale production lines. The adapter provides 4 analog input channels with throughput to memory at 15,000 conversions per second, 2 analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of option for analog input and output channels and programmed I/O mode for digital input and output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit or in the 5161 unit for each adapter desired. Maximum: 4. Customer Setup: Yes.

General Purpose Interface Bus Adapter (#1503): Provides an interface between an IBM Personal Computer and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters, and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300K bps and programmed I/O data rate of up to 10K bps. It allows the user to select interrupt level and memory access channels. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit or in the 5161 unit for each adapter desired. Maximum: 4. Customer Setup: Yes.

Data Acquisition and Control Adapter Distribution Panel (#1504): Provides easy access to the I/O signals, voltages, and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34 inches long that is permanently connected to the panel. The distribution panel is a printed

circuit board with 4 barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change, or remove the instruments and/or control points being used. Field Installation: Yes. Prerequisites: An Adapter Acquisition and Control Adapter for each panel desired. Maximum: 4. Customer Setup: Yes.

Asynchronous Communications Adapter (#2074): Provides a channel to data processing or input/output devices outside of the immediate system. Such devices can be connected by telephone using a plug-in modem, or directly by cable when the device is nearby. The communication "target" may be a large host computer, a Series/1, another 5150/5160, a paper tape reader, a communicating typewriter, a laboratory instrument, or other machines providing the popular RS-232-C asynchronous interface. The Asynchronous Communications Adapter is a standard feature on the 5160 Model 087. This adapter is flexible enough to match most of the computers and related products available in the microcomputer marketplace. The user's program selects the appropriate speed (50-9600 bps), format (5-, 6-, 7-, or 8-bit characters), parity and stop bits to reflect the attached device. Once communication has been established, the user's program performs reads and writes. Interrupts permit the program to perform data processing such as calculating, diskette reading or writing, or printing, and then pause to resume communications when a signal appears on the line. The adapter provides an EIA RS-232-C interface. 1 25-pin "D" shell, male-type connector is provided to attach various peripheral devices. In addition, a current-loop interface is located in the same connector. A jumper block is provided to select manually either the voltage or the current-loop interface. Maximum: 2. Cable: A user-supplied communication cable is required for connection of external modems or other devices to the Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature system expansion slot is required. Customer Setup: Yes.

SDLC Communications Adapter (#2090): (NO LONGER AVAILABLE) (Replaced by feature #1205) The SDLC Communications Adapter when used with the SNA 3270 Emulation and RJE Support Program (6024036) permits the 5160 to emulate 3270 interactive SNA operation or 3770 batch SNA. The adapter provides the ability for a 5160 attached to a host system via communications lines to participate in a network using SDLC protocol. When used as a 3270 with the SNA 3270 Emulation and RJE Support Program, the 5160 operates as and appears to a host as a 3278 Model 2 attached to a 3274 Model 51C. Technical Information: EIA RS-232-C interface -- operates at up to 9600 bps (up to 4800 bps when used with the SNA 3270 Emulation and RJE Support Program) with switched or nonswitched line support (including multipoint) -- provides modem control functions -- facilitates program controlled data transfer -- supports electrical wrap and error status reporting -- prioritized interrupt system controls. Limitations: Only 1 Asynchronous Communications Adapter may be installed if the SDLC Communications Adapter is installed. Maximum: 1. Cable: The Communications Adapter Cable (#2067) allows the user to connect the SDLC Communications Adapter card to a modem via a plug at the rear of the 5160. The cable is double-shielded and approximately 3m (10 ft) in length. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Software such as the SNA 3270 Emulation and RJE Support Program (6024036) is required to allow communication. An external modem must be cable-connected between the SDLC Communications Adapter and the telephone line. Customer Setup: Yes.

10Mb Fixed Disk Drive (#2500): (NO LONGER AVAILABLE) Provides storage for user programs and data. 1 10Mb Fixed Disk Drive is provided as standard on the 5160. The disk drive has the same physical dimensions and mounting as the 320Kb diskette drive. Technical Information: 512 bytes per sector -- 17 sectors per track -- 306 tracks per surface -- 4 surfaces -- 3,600 rpm -- 90ms average access time -- 5M bps transfer rate. Maximum: 1. If a 5161 Model 002 is attached to the 5160, the 10Mb Fixed Disk Drive and the Fixed Disk Drive Adapter in the 5160 must be moved into the 5161 to provide a total of 20Mb of fixed disk storage (2 10Mb Fixed Disk Drives) available to the system. Field Installation: Yes. Prerequisites: #2501 (NO LONGER AVAILABLE). Customer Setup: Yes.

Fixed Disk Drive Adapter (#2501): (NO LONGER AVAILABLE) Provides the buffering, error detection, and data transfer between the 10Mb Fixed Disk Drive (#2500) and the 5160. 1 Fixed Disk Drive Adapter is included as a standard feature on the 5160. The Fixed Disk Drive Adapter can attach up to 2 10Mb Fixed Disk Drives. Technical Information: 32-bit error-correcting code -- micro-processor controlled -- on-board sector buffers -- internal diagnostics -- direct memory access (DMA) data transfer -- high-level command set -- automatic error detection and correction -- automatic retries on disk access. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Enhanced 5250 Emulation Installation Convenience Kit (#2870): Provides the following items necessary to permit attachment of the 5160 to the S/34, S/36, or S/38.

- Installation Convenience Kit: The Enhanced 5250 Emulation Installation Convenience Kit (#2870) includes the Enhanced Display Station Emulation Adapter, Enhanced 5250 Emulation Program Version 2.1, integrated attachment cable, Keyboard Enhanced 5250 Emulation Program Version 2.1 template, and manuals necessary to install the Enhanced Display Station Adapter and Enhanced 5250 Emulation Program in the IBM Personal Computer.

Allows connection of the 5160 as a peripheral to the S/34, S/36, or S/38 either as a locally connected workstation or remotely via a 5251-12. The 5160 can also attach remotely to a S/36 or S/38 via a 5294 Remote Control Unit. The 5160 in 5250 emulation mode has access to all the functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The 5160 can also operate as a stand-alone personal computer. Maximum: 1. Prerequisites: A 5160 with at least 128Kb of memory, an available full-feature system expansion slot, and 1 of the following: A) A 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900), or B) A 5153 Color Display and Color/Graphics Monitor Adapter (#4910), or C) A user-supplied 80-column by 25-row monitor and appropriate adapter. IBM Personal Computer Disk Operating System (DOS) is required. For more information, limitations, and prerequisites, refer to Programming Announcement dated June 18, 1985, or Product Announcement dated October 25, 1984, or dated 6/18/85.

Enhanced Display Station Emulation Adapter (#2871): Permits a 5160 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Model 12; or remotely via the 5294 Remote Control Unit to emulate a 5250 Emulation Program. As a 5250 workstation, the 5160 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 5160 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. 1 or 2 host sessions and one personal computer session can be active concurrently. Limitations: When used with the Enhanced 5250 Emulation Program, this Adapter cannot be installed in the 5161 Expansion Unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit. Maximum: 1. Customer Setup: Yes.

Remote 5250 Emulation Program (#2874): The Remote 5250 Emulation Program allows a single IBM Personal Computer to emulate a 5294 Remote Control Unit with an IBM Personal Computer emulating a 5291 or 5292-1 workstation and/or workstation printer attached over a communication line to a S/36 or S/38. The IBM Personal Computer in IBM 5250 emulation mode has access to all functions of the host system available to a display station operator, providing the user with the power of the S/36 or S/38. The IBM Personal Computer can also operate a stand-alone personal computer. Prerequisites:

- IBM Personal Computer Disk Operating System (DOS) Version 2.0, Version 2.1, Version 3.0, or later compatible versions.
- SDLC Communication Adapter (#2090) (NO LONGER AVAILABLE), and Communications Adapter Cable (#2067).
- At least 256Kb of memory in the IBM Personal Computer.
- 5.25-Inch Double-sided Diskette Drive (320K) and Adapter or 5.25-Inch Diskette Drive (1.2M) and Adapter in IBM Personal Computer AT.

Highlights:

5160 Personal Computer XT

- The IBM Personal Computer emulates a subset of the function of the 5292-2 Display Station. To the IBM System/34, IBM System/36 and IBM System/38 Business Graphics Utility programs, the IBM Personal Computer looks like a 5292-2. There is no IBM Personal Computer graphics printer support, output from the Business Graphics Utility programs can be directed to printers attached to the host. The Host Graphics Support, 5292-2 subset, will plot output on either the IBM 7372 (6-pen) or 7371 (2-pen) plotters (or equivalent) attached to the IBM Personal Computer via the Async port. For those who have written graphic orders directly from the System/34, System/36, or have used System/38 GDDM should note that all orders are accepted and validated. Due to the differences in the PC hardware and the device drivers, different results may be displayed or if the function is absent, result in a no-operation. Programmers should refer to the "Technical Reference Manual", G570-2222.

System/38 GDDM and PGR support the Host Graphics Support, 5292-2 subset. Due to product hardware differences between the 5292-2 and the emulation, some graphic orders may be accepted, checked for validity, but have no function. Please check the "Enhanced 5250 Emulation Program Version 2.1 Technical Reference", G570-2222.

- Table-Driven Printer Support: This enhancement provides 5256 or 5219 emulation for a variety of IBM Personal Computer printers and OEM printers, both parallel and serial. The user must provide a printer description table to the emulation program unless the printer model is found in the following table.

Note: IBM 5201 Quietwriter Printer (Model 001) is supported as an emulated 5219 and 5256 printer.

- 5256 Emulation:
 - IBM 5152 Matrix Printer (Model 001)
 - IBM 5152 Graphics Printer (Model 002)
 - IBM 5182 Color Printer
 - IBM 5216 Wheelprinter (Model 001)
 - IBM 5201 Quietwriter Printer (Model 001)
 - IBM 4201 Proprietary Printer
 - NEC 3550 Spinwriter*
- 5219 Emulation:
 - IBM 5182 Color Printer
 - IBM 5216 Wheelprinter (Model 001)
 - IBM 5201 Quietwriter Printer (Model 001)
 - NEC 3550 Spinwriter*

* Trademark of NEC.

1 sample printer description table supporting 5256 emulation on a wide range of printers is provided. The user now has the flexibility to select from a large number of printers available for attachment to the IBM Personal Computer and can choose the one that meets his/her needs.

- Serial Printer Attachment Support: The enhancement provides 5256 or 5219 emulation for a variety of IBM Personal Computer printers and OEM printers that are RS-232 compatible.
- Keyboard Enhancements:
 - Keystroke buffering (key ahead) or not
 - "Hot key" can be in keystroke playback string
 - Redefine the "hot key" to other keys instead of the "ALT-ESC"
 - Direct hot keying to emulated or DOS session
 - Printer session
 - Support keystroke playback string
 - Uses the customized layout
 - Playback string increased to 510

There is a program provided to convert Version 2.0 keyboard profiles to Version 2.1 keyboard profile.

- Additional Graphics Adapter Support: This enhancement provides 5292-2, subset emulation for the EGA and VGA graphics adapter.
- Upgrade Kit: The current owner of Enhanced 5250 Emulation Program will be offered an upgrade to the Enhanced 5250 Emulation Program Version 2.1 for an upgrade charge.

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- Allows the IBM Personal Computer to operate as a stand-alone personal computer or as a 5250 workstation and printer in a remote environment.
- Can be used like a 5291 or 5292-1 display and 5256 or 5219 printer.
- Writes the contents of the display screen on an IBM Personal Computer Printer if the IBM Personal Computer has a printer attached or can be directed to a host-attached printer.
- Allows concurrent access to the IBM Personal Computer Fixed Disk while the IBM Personal Computer Remote 5250 Emulation Program is active.
- Provides the capability to establish 2 host sessions and 1 IBM Personal Computer session.
- Host sessions can be a single display session, a display session and a printer emulation session, or 2 display sessions.
- Uses 'Hot Key' sequence to switch among sessions.
- The IBM Personal Computer Printer can be used to emulate an IBM 5256 Matrix Printer or IBM 5219 Printer.
- When the host sessions are not displayed on the IBM Personal Computer display, they remain active and continue processing the host application.
- The IBM Personal Computer session is active only when displayed on the IBM Personal Computer Display.
- Provides predefined keyboard configurations for a 5291 or IBM Personal Computer keyboard or allows the user to define the keyboard to satisfy his requirements.
- Printer Emulation remains active while in IBM Personal Computer mode unless suspended by the operator.
- Virtual disk support when used with PC Support/36.
- Virtual Diskette support when used with the File Support Utilities.

Limitations:

- Magnetic stripe reader, selector light-pen, and multinational character sets for 5250 family of displays are not supported.
- As a result of physical differences between displays, some information displayed on the 5291 and 5292 may appear differently than on the IBM Personal Computer display.
- The Enhanced 5250 Emulation Program will work with most IBM Personal Computer programs. However, programs that overlay the emulator, that use the same interrupt level, that use Virtual Device Interface (VDI) Host Graphics or are sensitive to the address at which they are loaded may not be compatible. Interrupt Level 5 is used by the Enhanced Display Station Emulation Adapter and may not be modified.
- When using the Enhanced 5250 Emulation Program Version 2.1 with the IBM Personal Computer-System/36 Transfer Facility PRPQ or the IBM Personal Computer-System/38 Transfer PRPQ users must ensure that they sign onto the system before executing the Transfer Facility programs.
- Communications on the PC cannot be active when using the Enhanced Graphics Adapter (EGA) and/or Voice Communication Option Asynchronous Data Communication, Function Set. The Host Graphics Support, 5259 subset, will plot output to plotters attached to the IBM Personal Computer via the async port.
- Communication may be active with the Color Graphic Adapter (CGA) or the Professional Graphics Controller (PGA).
- To display graphics data in the host graphics session, the DOS session must be dedicated to the GR5250.COM program. This is accomplished by running the GR5250.COM program in the DOS session. The DOS session can be readily made available at any time for user's program(s) by terminating the GR5250.COM program.
- The 5219 printer emulation does not have dual drawer selection support.

The US English version on the Enhanced 5250 Emulation Program Version 2.1 does not support PC keyboards character set other than US English. National language versions of the program are required to support national language keyboards character set.

Configuration Requirements on S/36/38: The S/36 and S/38 must have the appropriate communications adapter installed. See the machine sections of the S/36 and S/38 for the communication features. Packaging: The Remote 5250 Emulation Program (#2874) consists of a "User's Guide", 2 5.25-inch double-sided diskettes

(320K) with the remote emulation program, display station status stock-on labels, and keyboard templates. Model Conversion: None.

Enhanced 5250 Emulation Program (#2875): When used with the Enhanced Display Station Emulation Adapter, the IBM Personal Computer can be attached to a S/34, S/36, or S/38 as a peripheral, either locally via the workstation controller or remotely via the 5251-12. The IBM Personal Computer can also be attached to the S/36 or S/38 remotely via the 5294 Remote Control Unit. The IBM Personal Computer emulates a 5291 workstation and a 5256 Matrix Printer or 5219 Printer. The IBM Personal Computer in 5250 emulation mode has access to all functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The IBM Personal Computer can also function as a stand-alone personal computer.

Prerequisites:

- IBM Personal Computer Disk Operating System Version 1.1, 2.0, 2.1, 3.0, or later compatible versions.
- Enhanced Display Station Emulation Adapter.
- At least 128Kb of memory in the IBM Personal Computer.
- 1 available full-feature system expansion slot.
- 5.25-inch double-sided diskette drive (320K) and adapter or 5.25-inch diskette drive (1.2M) and adapter in IBM Personal Computer AT.

Highlights:

- Allows the IBM Personal Computer to operate as a stand-alone personal computer or as a 5250 workstation and printer.
- Can be the only device on a twinaxial line or intermixed with other displays and/or printers on the same line attached to the S/34, S/36, or S/38.
- Can be used like a 5291 or 5292-1 display and 5256 or 5219 printer.
- (Selected Countries > Can be used as the system console for the S/34 and S/36. <)
- Writes the contents of the display screen on an IBM Personal Computer printer if the IBM Personal Computer has a printer attached or can be directed to a host attached printer.
- Can be used as an alternate console on the S/34 or S/36.
- Allows the concurrent access to the IBM Personal Computer Fixed Disk while the Enhanced 5250 Emulation Program is active.
- Provides the capability to establish 2 host sessions and 1 IBM Personal Computer session.
- Host sessions can be a single display session, a display session and a printer emulation session, or 2 display sessions.
- Uses 'Hot Key' sequence to switch among sessions.
- The IBM Personal Computer printer can be used to emulate an IBM 5256 Matrix Printer or IBM 5219 Printer.
- When the host sessions are not displayed on the IBM Personal Computer display, they remain active and continue processing the host application.
- The IBM Personal Computer session is active only when displayed on the IBM Personal Computer Display.
- Provides predefined keyboard configurations for a 5291 or IBM Personal Computer keyboard or allows the user to define the keyboard to satisfy his requirements.
- Allows the host workstation addresses to be set by an IBM Personal Computer Program. There are no physical switches for these functions.
- Automatic twinaxial termination with Integrated Attachment Cable. No on-card switch or termination plug required.
- Printer Emulation remains active while in IBM Personal Computer mode unless suspended by the operator.
- Virtual disk support when used with PC Support/36.
- Virtual Diskette support when used with the File Support Utilities.

Limitations:

- Magnetic stripe reader, selector light-pen, and multinational character sets are not supported with the IBM Personal Computer attachment.
- Because of the physical differences between displays, some information displayed on the 5291 and 5292-1 may appear differently on the IBM Personal Computer Display (e.g., The IBM

Personal Computer does not support an identical character set with the 5250, the color adapter does not support under-scoring, column separators are different, and color on the color monitor is different.

- The Enhanced 5250 Emulation Program will work with most IBM Personal Computer programs. However, there are some programs that may not be compatible, such as a program that overlays the emulator or a program that supports the same interrupt level or a program that is sensitive to the address it is loaded at in IBM Personal Computer storage.

Configuration Requirements on the S/34/S/36/S/38: The IBM Personal Computer with the Enhanced Display Station Emulation Adapter and Enhanced 5250 Emulation Program may be attached to any model of the S/34, S/36, or S/38 that is not already fully configured with the maximum permissible number of workstations. Maximum: The maximum number of IBM Personal Computers that can be attached locally to the S/34, S/36 and S/38 is the same as the maximum number of workstations allowed on each system.

IBM Personal Computers may be intermixed with other 5250 workstations and workstation printers up to the combined total of 7 IBM Personal Computers, workstations, and/or workstation printers per cable port as a distance of up to 1,524m from the system. Cable-through is supported via the Integrated Attachment Cable (#2877).

Remote attachment of more than 1 IBM Personal Computer in a single location requires a 5251-12 with a cluster or dual cluster feature or a 5294 Remote Control Unit.

Packaging: The Enhanced 5250 Emulation Program (#2875) consists of a user's guide, a 5.25-inch double-sided diskette (320K) containing the emulation program, display station status stick-on labels, and keyboard templates. Model Conversions: None.

Integrated Attachment Cable (#2877): Required to permit attachment of the Enhanced Display Station Emulation Adapter to the system twinaxial cables of the S/34, S/36, S/38, 5294 Remote Control Unit or 5251-12. Prerequisites: Enhanced Display Station Emulation Adapter. Maximum: 1. Field Installation: Yes.

Enhanced Display Station Emulation Adapter (#2879): (Includes "Enhanced Display Station Emulation Adapter Installation and Problem Determination Manual" and Enhanced Display Station Emulation Adapter Diagnostic Diskette.) Allows connection of the 5160 to the S/34, S/36, or S/38 either locally through the workstation controller or remotely via a 5251-12. The 5160 can also be connected remotely to the S/36 and S/38 via the 5294 Remote Control Unit. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot in the 5160 System Unit is required. The Integrated Attachment Cable (#2877) is required to attach the adapter to the twinaxial cable. Customer Setup: Yes. For more information, refer to Product Announcement dated October 25, 1984.

5253 Emulation Installation Convenience Kit Version 2 (#2882): Provides the following items necessary to permit attachment of the 5160 to the 5520 Administrative System:

- Display Station Emulation Adapter (#2887)
- 5520/Personal Computer Attachment Program Version 2 (#2884)
- T-connector (#2891)
- Twinaxial Cable Assembly (#2892)

When emulating a 5253, the 5160 user has access to the word- and record-processing functions, storage, distribution, and 3270 emulation facilities, and most other functions of the 5520 Administrative System. Maximum: 1. Field Installation: Yes. Customer Setup: Yes. Prerequisites: A 5160 with a minimum of 128Kb of user memory, an available full-feature system expansion slot, 1 5.25-Inch Diskette Drive Adapter (#3780), 1 5.25-Inch Diskette Drive (single-sided, #3800 (NO LONGER AVAILABLE) or double-sided #3810 (NO LONGER AVAILABLE)), and 1 of the following display options: A) A 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900), or B) a 5153 Color Display and the Color/Graphics Monitor Adapter (#4910), or C) a user-supplied 80-column color video monitor and the Color/Graphics Monitor

Adapter (#4910). 1 Terminator (#2893) is required only if the 5160 is the last display station or only display station on a twinaxial line. IBM Personal Computer Disk Operating System (DOS) Version 2 (6024061) is required. Limitations: The 5160 should not be used as the master display station or as the alternative master display station on the 5520 Administrative System.

5250 Emulation Convenience Kit (#2886): Provides the following items necessary to permit attachment of the 5160 to the S/34, S/36, or S/38:

- Personal Computer/Display Station Emulation Adapter (#2887)
- Personal Computer 5250 Emulation Program (#2885)
- T-connector (#2891)
- Twinaxial Cable Assembly (#2892)

Allows connection of a 5160 as a peripheral to a S/34, S/36, or S/38 either as a locally-attached workstation or remotely by using a 5251-12. The 5160 in 5250 emulation mode has access to the functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The 5160 can also operate as a stand-alone personal computer. Maximum: 1. Prerequisites: A 5160 with a minimum of 64Kb of user memory, an available full-feature system expansion slot, 1 5.25-Inch Diskette Drive Adapter (#3780), 1 5.25-Inch Diskette Drive (single-sided (#3800) (NO LONGER AVAILABLE) or double-sided (#3810) (NO LONGER AVAILABLE)), and 1 of the following display options: A) A 5151 Monochrome Display and the Monochrome Display and Printer Adapter (#4900), or B) a 5153 Color Display and the Color/Graphics Monitor Adapter (#4910), or C) a user-supplied 80-column color video monitor and the IBM Color/Graphics Monitor Adapter (#4910). 1 Twinaxial Cable Adapter (#2894) is required in place of the T-connector if the 5160 is the last display station or only display station on a twinaxial line. IBM Personal Computer Disk Operating System (DOS) is required. Limitations: The Display Station Emulation Adapter (#2887) must be installed in the 5160 system unit and not in a 5161 Expansion Unit.

Display Station Emulation Adapter (#2887): Allows connection of the 5160 to the 5520 Administrative System or to the S/34, S/36, or S/38. When used with the 5520/Personal Computer Attachment Program Version 1 (#2888) or Version 2 (#2884), a 5160 equipped with this option has access to the word processing, records processing, storage, distribution, and 3270 emulation (Version 2 only) facilities of a local 5520 system. When used with the Personal Computer 5250 Emulation Program (#2885), a 5160 equipped with this option can be connected to a S/34, S/36, or S/38 either as a locally attached workstation or remotely by using a 5251-12 Display Station. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. For attachment of this option to the 5520 Administrative System, a T-connector (#2891) and Twinaxial Cable Assembly (#2892) are required. In addition, a Terminator (#2893) is required if the 5160 is the last display station, or only display station, on a twinaxial line. For attachment of this option to a S/34, S/36, or S/38, a Twinaxial Cable Assembly (#2892) is required. In addition, a T-connector (#2891) is required if the 5160 is not the last device on a twinaxial line. A Twinaxial Cable Adapter (#2894) is required in place of the T-connector if the 5160 is the last or only device on a twinaxial line. Customer Setup: Yes. Limitations: When used with the Personal Computer 5250 Emulation Program (#2885) or the 5520/Personal Computer Attachment Program Version 1 (#2888) this option must reside in the 5160 system unit and not in a 5161 Expansion Unit.

T-connector (#2891): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the system twinaxial cables of the 5520 Administrative System or the S/34, S/36, or S/38. Limitations: Required for S/34, S/36, or S/38 attachment only if the 5160 is not the last device on the cable. Prerequisites: #2892. Maximum: 1. Field Installation: Yes.

Twinaxial Cable Assembly (#2892): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the system twinaxial cables of the 5520 Administrative System or S/34, S/36, or S/38. Prerequisites: #2887. Maximum: 1. Field Installation: Yes.

Terminator (#2893): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the 5520 Administrative System if the 5160 is the last display station, or only display station, on

a twinaxial line. Prerequisites: #2891 and #2892. Maximum: 1. Field Installation: Yes.

Twinaxial Cable Adapter (#2894): Required to permit attachment of the Display Station Emulation Adapter (#2887) to the S/34, S/36, or S/38 if the 5160 is the last or only device on a twinaxial line. Prerequisites: #2892. Maximum: 1. Field Installation: Yes.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Personal Computer with a network adapter to the IBM Cabling System or directly to an access unit.

IBM Token-Ring Network PC Adapter (#3391): Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS), and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitations: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

Stick-On Keypad Labels-PC Style (#3606): These labels can be placed on the IBM Personal Computer keypads for 5250 emulation in personal computer style. 1 set is provided in the 5364 shipping carton. This feature should be ordered only for additional set(s) of labels.

Stick-On Keypad Labels-5250 Style (#3641): These labels can be placed on the IBM Personal Computer keypads for 5250 emulation in 5250 style. 1 set is provided in the 5364 shipping carton. This feature should be ordered only for additional set(s) of labels.

Displaywriter/Personal Computer Attach Convenience Kit (#3728): Permits a Displaywriter system (without any communications features installed in the diskette unit) to be cable-connected to a 5160 via an Asynchronous Communications Adapter. The Compact Printer Connector Adapter (#0102) is also required. This attachment allows a Displaywriter to participate in a PC Cluster. When the Displaywriter is attached to a stand-alone 5160, the Displaywriter is used for operational control. Functions supported include transfer of documents and files between the Displaywriter and the 5160 including conversion of the document to revisable form text document content architecture (RFTDCA) prior to transfer to the 5160, and conversion from RFTDCA before transfer of documents to the Displaywriter. It is recommended that only DOS print files be transferred to the Displaywriter. Addition functions include the ability to display files on either system unit, and an optional foreground execution facility which supports alternating between Displaywriter/Personal Computer Attach program functions and Textpack 4 or Textpack 6 functions. Limitations: Each user who is to share an application program on a PC Cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit. Maximum: 1. Customer Setup: Yes.

5.25-Inch Diskette Drive Adapter (#3780): (NO LONGER AVAILABLE) Provides for the attachment of up to 2 5.25-inch diskette drives. Both single-sided and double-sided drives are supported by the adapter. The adapter is a standard feature on the 5160. Limitations: The 5.25-Inch Diskette Drive Adapter must be installed in the 5160 System Unit and not in a 5161 Expansion Unit. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

5.25-Inch Single-Sided Diskette Drive (#3800): (NO LONGER AVAILABLE) Provides for the 5160 to read and write data on 1 side of a soft-sectored 5.25-inch diskette. Formatted storage capacity is approximately 160Kb (180Kb with IBM Personal Computer DOS 2.0). Technical Information: Track density -- 48 tracks per inch; number of tracks -- 40 per surface; data surfaces -- 1 per diskette; rotational speed -- 300 rpm; access time -- 8ms track-to-track; data transfer rate -- 20,480 bytes per second. Limitations: Installation of a 5.25-inch single-sided Diskette Drive in the 5160 may require the

removal and transfer of a previously installed 10Mb Fixed Disk Drive to a 5161 Model 002. Maximum: Up to 2 diskette drives (single- or double-sided) may be installed in a 5160. Field Installation: Yes. Prerequisites: #3780. Customer Setup: Yes.

5.25-Inch Double-Sided Diskette Drive (#3810): (NO LONGER AVAILABLE) Allows the 5160 to read and write data on both sides of a soft-sectored 5.25-inch diskette. Formatted storage capacity is approximately 320Kb (360Kb with IBM Personal Computer DOS 2.0). Technical Information: Track density -- 48 tracks per inch; number of tracks -- 40 per surface; data surfaces -- 2 per diskette; rotational speed -- 300 rpm; access time -- 6ms track-to-track; data transfer rate -- 20,480 bytes per second. The 5.25-Inch Double-Sided Diskette Drive resides inside the 5160 to provide diskette access from the front. 1 Double-Sided Diskette Drive is standard on the 5160. Limitations: Installation of an additional 5.25-inch Double-Sided Diskette Drive in the 5160 may require the removal and transfer of a previously-installed 10Mb Fixed Disk Drive to a 5161 Model 002. Maximum: Up to 2 diskette drives (single- or double-sided) may be installed in a 5160. Field Installation: Yes. Prerequisites: #3780. Customer Setup: Yes.

XT/370 Option Kit (#3891): The XT/370 Option Kit is a set of 3 cards which allow the 5160 to execute many of the S/370 instructions and/or act as a 3277-2 Display Station. Following is a description of these cards:

1. **XT/370 Processor Card (PC/370-P Card):** Consists of 3 micro-processors, a page table and attendant circuitry. The first microprocessor engine executes most of the commonly used fixed point S/370 instructions. The second microprocessor emulates the remaining non-floating point S/370 instructions. The third microprocessor executes S/370 floating point instructions.
2. **XT/370 512Kb Memory Card (PC/370-M Card):** This Auxiliary RAM card contains 512Kb of parity-checked RAM accessible from either the PC/370-P Card or the Intel 8088 (the micro-processor for the 5160). Concurrent requests for memory accesses are arbitrated, with the 8088 accesses receiving highest priority. This memory (512Kb) is viewed in Personal Computer mode as a contiguous storage area that begins at the end of the 256Kb of required 5160 memory. However, in Personal Computer mode, the IBM Personal Computer XT/370 has only 640Kb of usable memory. When in this native mode, this memory operates marginally slower than the 256Kb of memory on the systems board. The PC/370-P Card views this memory as 2 separate areas which are not contiguously addressable. The area from 0 to 480Kb is addressed from 0 to 480Kb and is real S/370 space. The area from 480Kb to 512Kb is addressed from 0 to 32Kb and is control store for the second microprocessor on the PC/370-P Card.
3. **XT/370 3277 Emulation Card (PC/3277EM Card):** This Card provides the connection which permits the 5160 with XT/370 Option to attach via coaxial cable to an appropriately configured 3270 Control Unit. This permits local and remote operation so that the 5160 can emulate a 3277 Model 2 using the 5151 Monochrome Display. The Color Display (5153 Model 001) with appropriate adapter may also be used. Since there is no color support in 3277 mode, the default colors will be used if this color display is installed. This connection is also supported by VM/PC for upload and download of data between host VM systems and the 5160 with XT/370.

Maximum: 1. Field Installation: Yes. Customer Setup: Yes. Prerequisites: Must be installed respectively in full-feature slot numbers 4, 3, and 2 -- Software such as the VM/PC Licensed Program (6936733) -- A user-supplied coaxial cable to attach to a 3270 Controller -- 256Kb of memory on 5160 Systems Board.

2Mb Expanded Memory Adapter (#3905, P/N 2685193): Provides 2Mb of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30. The 2Mb Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to 2 PC DOS

virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel, and Microsoft.

The 2Mb Expanded Memory Adapter may be installed in any full-length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT, or Personal System/2 Model 30. However, a double socketed (16-bit) bus slot is recommended for the Personal Computer AT and 3270 Personal Computer AT to enable the 2Mb Expanded Memory Adapter to achieve optimum performance.

The 2Mb Expanded Memory Adapter will backfill conventional memory from the 256Kb address to the 640Kb address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to 2 PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2Mb Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16Kb increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2Mb) through 4 16Kb pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: 1 2Mb Expanded Memory Adapter. Field Installation: Yes.

6157 Tape Attachment (#4156, P/N 59X4156): This feature allows attachment of the 6157 Streaming Tape Drive for use with the 5364 unit. It is recommended that both the 5364 and its directly attached PC be dedicated to tape operation when the tape drive is being used. If the system is not dedicated, in most cases rated speed and capacity of the tape drive will not be achieved. See the M5364 pages for additional description and limitations.

5364 Driver Card (#4548): Allows connection of the IBM S/36 5364 System Unit. It is compatible with the IBM Personal Computer (5150), the IBM Personal Computer XT (5160), and the IBM Personal Computer AT (5170). Only 1 Driver Card may be installed. The personal computer must have a minimum of 256K and not more than 512K. See the 5364 Sales Manual Pages for additional limitations. Attachment is made through a 1.2m (47 in.) cable provided with the 5364 System Unit.

The 5364 Driver Card is shipped for convenience as an accessory to the 5364. It should not be ordered separately. Additional cards are available as an option on the IBM Personal Computer. These additional cards must be ordered through the parts replacement process.

The 5364 Driver Card is shipped for convenience, as an accessory, with the 5364. This option should be ordered only if an extra 5364 Driver Card is required.

If the personal computer has on-site maintenance, the on-site maintenance will also apply to the 5364 Driver Card.

Hardware Service and Maintenance Manual (Option #9205) available and can be purchased for the 5364 Driver Card.

The 5364 Driver Card is a unique card designed for the specific purpose of directly attaching a personal computer to the 5364 System Unit. A "Technical Reference Manual" for this card will not be provided. Individuals requiring interface information on the 5364 Driver Card may contact the IBM Corporate Communications.

Personal System/2 Display Adapter (#4050, 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of 1 of the following displays: 8503, 8512, 8513, and 8514.

Voice Communications Option (#4771): The Voice Communication Option adds specialized processing capability to digitize and process voice (audio) and telephony signals. Functions are Voice Record/Playback, Voice Recognition, Text-to-Speech, Telephony (including touch-tone signal recognition and generation), and Asynchronous Communications protocol and modem capability. The included adapter is programmable and the functions are loaded from system memory. Information can be processed from PC memory, attached microphone, telephone, and 2 telephone lines, and output to memory telephone or lines, or an external audio speaker. Prerequisites: A full-feature slot is required. Maximum: 1.

Personal Computer Voice Communications Adapter (#4839): This feature adds specialized processing capability to emulate a modem, record and play back voice (audio), recognize voice commands, convert text to speech, and recognize and issue telephony signals for the Personal Computer, the PC-XT and the PC-AT. The Personal Computer Voice Communications Adapter (#4839) to emulate an asynchronous modem, to record and playback voice, to recognize voice commands, to convert text to speech, to aid in using Voice Communications Adapter requires the Voice Communications Operating Subsystem program (#0708) to enable the function of the adapter and to process information to/from the PC memory and attached microphone, telephone, 2 telephone lines, or external speaker.

Monochrome Display and Printer Adapter (#4900): Provides for the attachment of the 5151 Monochrome Display Model 001 and parallel printers. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5160. Limitations: The primary monitor/display adapter must be installed in the 5160 System Unit and not in a 5161 Expansion Unit. Maximum: 1. Cable: The Printer Cable (#5612) is available to connect the 5152 Model 002 to the Monochrome Display and Printer Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Color/Graphics Monitor Adapter (#4910): Provides for the attachment of a color display to the 5160. Either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5153 Color Display Model 001, a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16 foreground and 8 background colors are supported in text (character) mode. This attachment also provides support for 4-color medium-resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 dots horizontal, 200 vertical). 256 characters are available in "text" mode, 128 in medium- or high-resolution graphics. The adapter provides 16Kb of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Limitations: The primary monitor/display adapter must be installed in the 5160 System Unit and not in a 5161 Expansion Unit. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

High-Speed Adapter (#4920): Provides for the attachment of the 3117 Scanner with Extension Unit or 3118 Scanner to the 5160 Personal Computer XT. This adapter is installed into full-size expansion slot of 5160 Personal Computer XT system unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS-422-A driver and receiver. The adapter is designed to the EIA RS-411-A electrical interface and provides 1 25-pin "D" shell, mail type connector. Maximum: 1. Cable: Communication Adapter Cable (P/N 1502067) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High-Speed Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Limitation: The High-Speed Adapter must be installed in the 5160 System Unit and not in a 5161 Expansion Unit.

Publications: Guide To Operations (6456788)

- #2701, GA18-2476. US English
- #2753, GA09-0378. Canadian French

- #2707, GA10-0125, Spanish

Publications available at a fee for the IBM Personal Computer High-Speed Adapter are:

High-Speed Adapter Guide to Operations

- 6456785, GA10-0125, Spanish
- 6456787, GA09-0378, Canadian French
- 6456788, GA18-2476, US English

High-Speed Adapter Hardware Maintenance and Service

- 6455787, SY18-2167, US English

High-Speed Adapter Technical Reference

- 6455771, SC18-2117, US English

3117 Adapter (#4925): Allows connection of the 3117 Scanner to the 5160. This adapter is installed into full-size expansion slot of the 5160 system unit. The adapter provides a connector for attachment of the 3117 Scanner Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: 1. Cable: A 3117 Personal Computer Cable (#3005) is required. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Limitation: Can not be installed in the 5161 Expansion Unit.

Publication: Guide To Operations (6456831)

- #2702, GA18-2477, US English
- #2751, GA09-0375, Canadian French
- #2708, GA10-8813, Spanish

Publications available at a fee for the IBM Personal Computer 3117 Adapter are:

- Guide To Operations for the IBM 3117 Scanner and the 3117 Adapter
 - 6456831, GA18-2477, US English
 - 65X1747, GA09-0375, Canadian French
 - 65X1745, GA10-8813, Spanish
- IBM 3117 Scanner Hardware Maintenance and Service
 - 6456833, SY18-2159, US English
 - 65X1748, SY11-1018, French
- IBM 3117 Scanner Technical Reference
 - 6456837, SC18-2105, US English

3278/79 Emulation Adapter (#5050): (standard in Model 589) Expands the capabilities of the 5160 by providing attachment to the 3274 and 3276 Control Unit, the 4331 or 4361 Processor Display/Printer Adapter, or the 9370 Workstation Subsystem Controller, or the 4361 Workstation Adapter, or the 4701 Finance Communication Controller. When used with the IBM PC 3270 Emulation Program, Entry Level or IBM Personal Computer Virtual Machine/Personal Computer (VM/PC) (6024175 #4175), the 5160 can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A and can also support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS session can be active concurrently and the user can interact with either session alternately. Maximum: 1. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5160 system unit full-feature expansion slot is required. Customer-supplied attachment media is required for host system attachment. Software such as the IBM PC 3270 Emulation Program, Entry Level is required. A 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required to allow for file transfer. File transfers with VM hosts is provided with VM/PC. File transfers with MVS/TSO hosts is provided with VM/PC if TSO Host Server (5798-DTL) is installed on the MVS system. For attachment to the 4331, specify code #9843 must be installed on the 4331. For attachment to the 4701, the Device Cluster Adapter (#3101) must be installed on the 4701. Limitations: File transfer is supported on the 4701 only with the IBM 4700 Personal Computer Application Services Program Product (P/N 6934406). For additional information, limitations, and prerequisites, see Product Announcement dated April 2, 1986.

IBM Token-Ring Network PC Adapter II (#5063): Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS), and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitations: The adapter must be installed in the system unit and cannot be installed in the 5161 Expansion Unit.

Printer Adapter (#5200): Provides for attachment of parallel printers. This option is used when the Color/Graphics Monitor Adapter (#4910) is selected instead of the Monochrome Display and Printer Adapter (#4900), or when support for more than 1 printer is required and the Monochrome Display and Printer Adapter is already installed. The adapter provides a connector for attachment of the printer cable to the rear of the 5160. Maximum: 1. Cable: The Printer Cable (#5612) is available to connect the 5152 Model 002 to the Printer Adapter. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature system expansion slot. Customer Setup: Yes.

(Except LAD > PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD > The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD > Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
 Depth - 336mm (13.26 in.)
 Height - 107.95mm (4.25 in.)
 Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
 Relative Humidity: 8 to 80 percent
 Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <)

IBM 4700 Personal Computer Financial Input Option (#6049): This option allows the attachment of 4704 Finance Keyboards, Magnetic Readers, Magnetic Reader/Encoder, IBM 4706 Document Codeline and Magnetic Reader, clear and encrypting PIN pads using DOS 2.1 or later. Each option contains the Financial Input adapter card, the Financial Input Connector Assembly, installation and problem determination procedures, diagnostic diskette, microcode diskette with device drivers and configuration customization, and a microcode users guide. The keyboard attachment is transparent to DOS applications. All keyboards (except the Enhanced PC keyboard) are plugged into the connector assembly. The Enhanced PC keyboard

always connects to the system unit keyboard adapter. Keyboards may be combined in the following way:

- Finance Administrative Keyboard stand-alone
- Finance Expanded Alphameric Keyboard stand-alone
- PC Keyboard or Enhanced PC Keyboard stand-alone
- Finance Expanded Alphameric Keyboard with Finance Function Keyboard
- Finance Alphameric Keyboard with Finance Function Keyboard
- PC Keyboard or Enhanced PC Keyboard with Finance Function Keyboard*

* This combination is valid only in a PC application and not in the terminal emulation provided by the 4700 Personal Computer Application Services.

1 magnetic reader or reader/encoder or IBM 4706 Document Codeline and Magnetic Stripe Reader and one clear or encrypting pin pad may be attached in addition to the keyboard combinations listed above. They may be accessed by DOS applications via standard DOS device drivers provided. For more information about finance keyboards, see #4607, #4650, #4662, and #4677 above. For more information about finance keyboards, magnetic readers, magnetic reader/encoder, and clear or encrypting PIN pads, see M4704 pages. Prerequisites: An IBM Personal Computer XT with 256Kb on system board. Maximum: 1. Limitations: This adapter must be installed in the system unit and not in a Expansion Unit.

IBM Realtime Interface Co-Processor (#6050, #6160, #6165, #6166): The IBM Realtime Interface Co-Processor is an interface subsystem for IBM Industrial Computers and IBM Personal Computers. A Realtime Interface Co-Processor (ARTIC) in conjunction with its software support provides support for attachment of Programmable Controllers in industrial applications.

The IBM Realtime Interface Co-Processor will be available with either 128Kb or 512Kb of standard memory and either 5.25- or 3.5-inch program media.

- Standard Features:
 - Advanced high-performance Intel(1) 80186 micro-processor
 - 128Kb or 512Kb of dual-ported memory with parity for error detection (128Kb expandable to 256Kb, 512Kb expandable to 1,024Kb)
 - 8-bit mode and 16-bit mode data bus support
 - 2-channel direct memory access for use between the co-processor storage and its interface ports
 - 8 selectable interrupt levels
 - Zilog(2) 8030 Serial Communications Controller
 - 2 serial I/O ports
 - Data rates up to 64K bps full-duplex with external clocking on 1 port, while the second port is operated at 19.2K bps full-duplex
 - Transmit and Receive status-indicators
 - Half-Duplex and Full-Duplex operation
 - Asynchronous, bit synchronous, and character synchronous protocol hardware support
 - CRC generation and checking
 - Pluggable Interface Boards
 - Custom Interface Board support
 - Byte-wide I/O Interface available at Interface Board Connector
 - All external signals available at Interface Board connector
 - 5 programmable hardware timers
 - Watchdog timer
 - Watchdog timer status-indicator
 - "IBM Realtime Interface Co-Processor Guide to Operations":
 - ▲ Hardware setup
 - ▲ Software setup
 - ▲ Problem determination procedures
 - ▲ Customer diagnostics diskette
 - Realtime Control Program microcode:
 - ▲ Multi-tasking, preemptive priority
 - ▲ Co-Processor memory management
 - ▲ Timer support
 - ▲ Watchdog timer support

- ▲ Queue management
- ▲ Inter-task communications
- ▲ Initial Program Load
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader
- Optional Features:
 - EIA RS-232-C/CCITT V.24 Interface Board (#6051)
 - EIA RS-422-A Interface Board (#6064)
 - CCITT V.35 Interface Board (#6053)
 - 20mA Current Loop Interface Board (#6066)
 - Realtime Interface Co-Processor 128Kb Memory Expansion (#6055) (can only be used with features #6050 and #6165)
 - Realtime Interface Co-Processor 512Kb Memory Expansion (#6161) (can only be used with features #6160 and #6166)
 - RS-232-C Direct Attach Interface Cable (#6056)
 - RS-232-C Modem Attach Interface Cable (#6057)
 - "IBM Realtime Interface Co-Processor Technical Reference" (#6058):
 - ▲ Hardware technical information
 - ▲ Realtime Control Program microcode description
 - ▲ Interface Board design information
 - "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (#6059):
 - ▲ Problem determination procedures
 - ▲ Advanced Diagnostics Diskette
 - ▲ Wrap connector
 - CCITT V.35 Interface Cable (#6061)

The Realtime Interface Co-Processor has been designed for use in industrial applications of the IBM Industrial Computers and IBM Personal Computers. The Co-Processor is compatible with the 5531, 7531, 7532, 5160, and 5170 computer systems. The 5531 Industrial Computer and 5160 Personal Computer are based on the Intel(1) 8088 microprocessor. The 7531 and 7532 Industrial Computers and 5170 Personal Computer are based on the Intel(1) 80286 microprocessor.

The Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are 2 independent serial ports that operate at speeds up to 64K bps using direct memory access. 1 port can operate at 64K bps full-duplex, while the second is operated at a maximum of 19.2K bps full-duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the co-processor is designed to accept 2 optional interface boards or user developed custom interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the Interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20mA Current Loop Interface Board
- CCITT V.35 Interface Board

A maximum of 2 Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be found in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit mode on the 5531 and 5160 and in 8-bit or 16-bit mode on the 7531, 7532, and 5170.

The Realtime Interface Co-Processor will be available in 2 memory capacities, 128Kb and 512Kb, and will be shipped with either 5.25-inch or 3.5-inch program media.

- IBM Realtime Interface Co-Processor with 128Kb of memory and 5.25-inch program media (#6050)
- IBM Realtime Interface Co-Processor with 128Kb of memory and 3.5-inch program media (#6165)
- IBM Realtime Interface Co-Processor with 512Kb of memory and 5.25-inch program media (#6160)
- IBM Realtime Interface Co-Processor with 512Kb of memory and 3.5-inch program media (#6166)

All Realtime Interface Co-Processor features are functionally equivalent. Features #6050 and #6165 are shipped with 128Kb of memory, upgradable to 256Kb, and features #6160 and #6166 are shipped with 512Kb of memory, upgradable to 1024Kb. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128Kb Memory Expansion Option (#6055) (Can only be used with features #6050 and #6165)
- 512Kb Memory Expansion Option (#6161) (can only be used with features #6160 and #6166)

Detailed technical information on the Realtime Interface Co-Processor is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

Realtime Control Program: The Realtime Control Program is microcode for the Realtime Interface Co-Processor. It is included with the Co-Processor feature and is shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The Realtime Control Program microcode provides a realtime, multi-tasking operational environment for supporting user applications running on the Realtime Interface Co-Processor. The Realtime Control Program microcode is loaded from the system unit memory to the Realtime Interface Co-Processor memory. Once loaded, the Realtime Control Program microcode initializes itself and the Realtime Interface Co-Processor. It then signals the system unit processor that it is loaded and ready.

The Realtime Control Program microcode supports up to 253 concurrent tasks running on the co-processor. Tasks are loaded from the system unit memory. A task running under the Realtime Control Program microcode may communicate with another task running under the control program or with an application program running in the system unit.

The Realtime Control Program microcode provides support for interfacing IBM Industrial Computer or Personal Computer applications to the Realtime Control Program microcode and uses the IBM PC Macro Assembler as the program-preparation facility.

The Realtime Control Program microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 256 software timers with increments ranging from 5ms to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Inter-task communications is accomplished by the wait/post mechanism. Data may be passed between tasks by user queues.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Realtime Interface Co-Processor upon failure. It will also switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the Realtime Control Program microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

The Realtime Interface Co-Processor can coexist with the following IBM Industrial and Personal Computer adapters:

- 64/256Kb Memory Expansion Option (#1013)
- 128Kb Memory Expansion (#0209)

- 512Kb Memory Expansion (#0203)
- PC Network Adapter (#0213)
- Enhanced Color Graphics Adapter (#1200)
- Combination Adapter II (#6020)
- Binary Synchronous Communications Adapter (#1204)
- SDLC Communications Adapter (#1205)
- Asynchronous Communications Adapter (#2074)
- Personal Computer Cluster Adapter (#1206)
- Data Acquisition and Control Adapter (#1502)
- General Purpose Interface Bus Adapter (#1503)
- Color/Graphics Monitor Adapter (#4910)
- Serial/Parallel Adapter (#0215)
- 10Mb Fixed Disk Drive/Adapter Kit (#6018)
- Printer Adapter (#5200)
- Monochrome Display and Printer Adapter (#4900)
- 3278/79 Emulation Adapter (#2507)
- XT/370 Option Kit (#3891)
- Token-Ring Network PC Adapter (#9100)
- Voice Communications Adapter (#4839)
- Game Control Adapter (#1300)
- Enhanced Display Station Emulation Adapter (#2879)
- 5253 Emulation Installation Convenience kit (#2882)
- 5250 Emulation Convenience Kit (#2886)
- AT/370 Option Kit (#6115)
- XT/370 Option Kit (#1509) (NO LONGER AVAILABLE)

Publications: The Realtime Interface Co-Processor will be shipped with one manual:

- "IBM Realtime Interface Co-Processor Guide to Operations"

The Guide to Operations covers the Realtime Interface Co-Processor and the optional Interface Boards and cables. The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Realtime Interface Co-Processor, optional Interface Boards, and cables. This publication is intended for anyone who will be installing, using, or programming the Realtime Interface Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available from Mechanicsburg.

The following manuals are available for purchase:

- "IBM Realtime Interface Co-Processor Technical Reference" (#6058): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Also included is detailed technical information on Interface Board design. It describes the interface between the Realtime Interface Co-Processor and the pluggable Interface Board. Detailed information on the programmer interfaces to the Realtime Control Program microcode is included.

The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Realtime Interface Co-Processor, Realtime Control Program microcode, optional Interface Boards and cables.

- "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (#6059): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Realtime Interface Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing co-processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and a 15-pin wrap-connector for use when running co-processor diagnostics.

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed in the "Compatibility" section of this document are not supported. The Realtime Interface Co-Processor is not designed to run DOS appli-

cations but is intended for industrial applications written to interface with the Realtime Control Program microcode. In most system configurations, 1 Realtime Interface Co-Processor can be installed in the 5531 and 5160 computers, and up to 3 can be installed in the 7531, 7532, and 5170 Computers. For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 80286-based IBM Industrial and Personal computers prohibits an 8-bit adapter (e.g., IBM Enhanced Graphics Adapter, PC Network Adapter, etc.) to be co-resident with a 16-bit adapter (Realtime Interface Co-Processor) within the same region.

See the "IBM Realtime Interface Co-Processor Technical Reference" for complete details.

Prerequisites: The Realtime Interface Co-Processor must be installed in 1 of the following systems:

- 5531 Industrial Computer
- 7531 Industrial Computer
- 7532 Industrial Computer
- 5160 Personal Computer
- 5170 Personal Computer

Customer Setup (CSU): The Realtime Interface Co-Processor and all options are customer setup (CSU). Detailed setup instructions are included with each co-processor card. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

Special Features:

- EIA RS-232-C/CCITT V.24 Interface Board (#6051): Adapts 1 of the co-processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.
- EIA RS-422-A Interface Board (#6064): Adapts 1 of the co-processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4,000 ft, however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.
- CCITT V.35 Interface Board (#6053): Adapts 1 of the co-processor's serial ports for compatibility with CCITT V.35 interfaces.
- 20mA Current Loop Interface Board (#6066): Adapts 1 of the co-processor's serial ports for compatibility with 20mA interfaces. The current loop Interface Board also has the capability to provide the 20mA current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.
- Realtime Interface Co-Processor 128Kb Memory Expansion (#6055): Expands the Realtime Interface Co-Processor (#6050 and #6165) memory from 128Kb to 256Kb. Only 1 128Kb Memory Expansion Option may be installed.
- Realtime Interface Co-Processor 512Kb Memory Expansion (#6161): Expands the Realtime Interface Co-Processor (#6160 and #6166) memory from 512Kb to 1024Kb. Only 1 512Kb Memory Expansion Option may be installed.
- EIA RS-232-C Direct Attach Interface Cable Option (#6056): Allows the user to connect 1 port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics. Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.
- EIA RS-232-C Modem Attach Interface Cable (#6057): Allows the user to connect 1 port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics. Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.
- CCITT V.35 Interface Cable (#6061): Allows the user to connect 1 port of the Realtime Interface Co-Processor to a CCITT

V.35 modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics. Note: This cable can be used only when the CCITT V.35 Interface Board (#6053) is installed.

Specified Operating Environment:

- Intel(1) 80186 Microprocessor
- 7.37M Hz clock speed
- 20-bit addressing
- 16-bit data path
- 128Kb or 512Kb Dynamic RAM
- 16Kb ROM

Operating Environment:

- Electrical:
 - Operating voltages:
 - ▲ +5V DC
 - ▲ +12V DC
 - ▲ -12V DC
 - ▲ -5V DC
 - Current requirements:
 - ▲ Realtime Interface Co-Processor:
 - △ +5V DC at 2.1A
 - ▲ RS-232-C/CCITT V.24 Interface Board:
 - △ +5V DC at 80mA
 - △ +12V DC at 35mA
 - △ -12V DC at 22mA
 - ▲ RS-422-A Interface Board:
 - △ +5V DC at 120mA
 - ▲ 20mA Current Loop Interface Board:
 - △ +5V DC at 35mA
 - △ +12V DC at 52mA
 - △ -12V DC at 45mA
 - ▲ CCITT V.35 Interface Board:
 - △ +5V DC at 150mA
 - △ -5V DC at 70mA
 - △ +12V DC at 15mA
 - △ -12V DC at 15mA
- FCC Class A: Installation of the Realtime Interface Co-Processor changes the FCC rating of the 5160 and 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. See the "IBM Realtime Interface Co-Processor Guide To Operations" for the FCC Statement.

Hardware Requirements: 1 of the following IBM system units is required for operation of the Realtime Interface Co-Processor:

- 5531 Industrial Computer Models 011 and 021
- 7531 Industrial Computer Model 041
- 7532 Industrial Computer Model 041
- 5160 Personal Computer Models 087, 068, 078, 267, 268, 277, 278, 088, and 089
- 5170 Personal Computer Models 068, 099, 239, 319, and 339

Software Requirements: The IBM Personal Computer Disk Operating System (DOS), Version 2.1, 3.0, 3.1, or 3.2 is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM Pascal.

To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- "IBM Realtime Interface Co-Processor Technical Reference" (#6058)
- Realtime Control Program DOS Support (5669-177)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

IBM 4700 Personal Computer Financial Output Option (#6052): This option allows the attachment of a single Finance Printer from this list using DOS 2.1 or later:

- 4710 Receipt/Validations Printer
- 4715 Continuous Forms Printer
- 4720 Forms/Passbook Printer - Models 1, 2, 3, or 4

The adapter card handles the Banking Loop protocol and data stream to the devices. It supports a single device with 1 or 2 logical device addresses. It attaches only devices that adhere to the 4700 Universal Device Processor protocols. Each option contains the Financial Output adapter card, the Financial Output Cable, installation and problem determination procedures, diagnostic diskette, microcode diskette with device drivers and configuration customization, and a microcode users guide. For more information about finance output devices, see M4710, 4715, and 4720 pages. Prerequisites: An IBM Personal Computer XT with 256Kb on system board. Maximum: 1. Limitations: This adapter must be installed in the 5160 system unit and not in a 5161 Expansion Unit. With this adapter installed memory is limited to 576Kb.

IBM 4700 Personal Computer Financial Security Option (#6054): It allows an application program using DOS 2.1 or later to encrypt and decrypt data for communications and files. The user can have the added security of encryption for sensitive communications data transmitted from the personal computer to another source over communications lines. The user can also protect sensitive programs and data stored on personal computer files via encryption. Each option contains the Financial Security adapter card, installation and problem determination procedures, diagnostic diskette, microcode diskette with adapter support, and a microcode users guide. Included is support to set the master and session keys. The functions of the adapter may be accessed by DOS applications via standard DOS interfaces provided. The algorithm used is the same as that used in the 4701/4702. Prerequisites: An IBM Personal Computer XT with 256Kb on system board. Maximum: 1. Limitations: This adapter must be installed in the system unit and not in a Expansion Unit.

8100 PC Adapter (#7630): Allows connection of a 5160 to an available station address on a local or remote RLOOP in an 8100 Information System configuration. Remote attachment of the 5160 requires a 3843 Loop Control Unit. This feature provides an adapter card, a 5.25-inch diskette with the 8100 PC Adapter Programs, the external cable required for attachment to an 8100 loop station connector, the "8100 PC Adapter User's Manual" and the 8100 PC Adapter Keyboard Template. When the 5160 is loop-connected to an 8100 operating with DPCX/DOSF Release 4, it allows the follow-

ing functions to be supported: 3270 display emulation, 5287 Printer emulation support, bidirectional file transfer between the 5150 and the 8100, S/370 host file transfer and screen capture to print the screen image to the 5160 printer or diskette. Limitations: The adapter is mutually exclusive with the SDLC adapter and cannot operate concurrently with an Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit. Maximum: 1.

4683 Model 2 Attachment Adapter Kit (#8314, P/N 83X7654): The 4683 Model 2 Attachment Adapter Kit provides the necessary adapter card, software, diagnostics, installation aid, and instructions for attaching 1 or 2 4683 Model 2s to an IBM Personal Computer XT. The kit consists of the following :

- IBM 4683 Model 2 Adapter Card and Wrap Plug
- Ship group that contains:
 - Lock Accessory Kit
 - Diskette Kit

Publications:

- IBM 4683 Model 2 Attachment Adapter Kit: Installation Guide
- IBM 4683 Model 2 Attachment Adapter Kit: Problem Determination Guide
- IBM 4680 Store System Terminal Operations Guide
- Guide to Operations IBM Personal Computer: 4683 Model 2 Attachment Adapter

The combination of the 4683 Model 2 and Attachment Adapter Kit connected to and installed on the IBM Personal Computer described in the specified operating environment provides the capability to attach up to 2 4683 Model 2 Point-of-Sale Terminals. The Attachment Kit is applicable to all small store environments where an in-store IBM Personal Computer XT and Application Program are available to meet the requirements. Maximum: 1. Prerequisites: An available full-feature slot in the system unit. Field Installation: Yes. Customer Setup: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

See your Country DP Supplies Coordinator.

5160 PERSONAL COMPUTER XT MODELS (Canada only > 088, 089, 267, 268, 277, 278

PURPOSE

The 5160 Models (Canada only > 088, 089, 267, 268, 277, and 278 <) are designed to offer additional capability not available in previously announced models of the IBM Personal Computer XT.

MODELS (CANADA ONLY > 088, 089, 267, 268, 277, AND 278

(Canada only > Model 088: (NO LONGER AVAILABLE) System Unit/IBM Personal Computer XT Keyboard, 640Kb Memory, 20Mb Fixed Disk Drive, 20Mb Fixed Disk Drive Adapter, 1 Half-High 5.25-Inch 360Kb Double-Sided Diskette Drive, Diskette Drive Adapter, and Asynchronous Communications Adapter.

Model 089: (NO LONGER AVAILABLE)

System Unit/Enhanced Personal Computer Keyboard, 640Kb Memory, 20Mb Fixed Disk Drive, 20Mb Fixed Disk Drive Adapter, 1 Half-High 5.25-Inch 360Kb Double-Sided Diskette Drive, Diskette Drive Adapter, and Asynchronous Communications Adapter.

Model 267: (NO LONGER AVAILABLE) System Unit/IBM Personal Computer XT Keyboard, 256Kb Memory, 1 Half-High 5.25-Inch 360Kb Double-Sided Diskette Drive, and Diskette Drive Adapter.

Model 268: (NO LONGER AVAILABLE)

System Unit/Enhanced Personal Computer Keyboard, 256Kb Memory, 1 Half-High 5.25-Inch 360Kb Double-Sided Diskette Drive, and Diskette Drive Adapter.

Model 277: (NO LONGER AVAILABLE) System Unit/IBM Personal Computer XT Keyboard, 256Kb Memory, 2 Half-High 5.25-Inch 360Kb Double-Sided Diskette Drives, and Diskette Drive Adapter.

Model 278: (NO LONGER AVAILABLE)

System Unit/Enhanced Personal Computer Keyboard, 256Kb Memory, 2 Half-High 5.25-Inch 360Kb Double-Sided Diskette Drives, and Diskette Drive Adapter. <)

Prerequisites: IBM Personal Computer DOS 3.1 or DOS 3.2, and a video display adapter and device for display output. DOS 3.2 is required to support 3.5-inch 720Kb diskette drive.

Customer Setup (CSU): The customer is responsible for unpacking and setting up system components and options for the 5160 Models (Canada only > 088, 089, 267, 268, 277, and 278 <) following the setup instructions provided.

The keyboard is plugged directly into the system unit. The display and printer are connected via option adapters installed in the system unit expansion slots. Once turned on, the system unit automatically runs a power-on self-test to verify system readiness. If a failure is found, an identifying number will appear on the screen. If the test is successfully completed, the system attempts to load an operating system (such as DOS) from the first diskette drive. Should an operating system not be found, the system attempts to load from the first fixed disk. If this operation is not completed, the BASIC interpreter is made ready, identified on the screen, and the system is available for use.

DESCRIPTION

System Unit Specifications:

- Intel 8088 Microprocessor
- 4.77M Hz clock speed
- 20-bit addressing
- 8-bit data path
- 64Kb x 8 ROM
 - Access time: 250ns

- Cycle time: 250ns
- (Canada only > 256Kb/ <) 640Kb RAM
 - Access time: 200ns
 - Cycle time: 345ns
 - Parity Checking
- 130 watt power supply
- Dimensions:
 - Width: 498mm (19.6 inches)
 - Depth: 410mm (16.2 inches)
 - Height: 147mm (5.8 inches)
- Weight:
 - ▲ (Canada only > Model 089: 30.6 pounds
 - ▲ Model 268: 24.7 pounds
 - ▲ Model 278: 26.7 pounds <)
- Power cable length: 1.8m (6 ft)

Operating Environment:

- Electrical: (Canada only > 90-137V <) AC, 50 or 60 Hz
- Air temperature:
 - System on: 15.6 to 32.2C (60 to 90F)
 - System off: 10.0 to 43.0C (50 to 100F)
- Wet bulb temperature:
 - System on: 22.8C (73F)
 - System off: 26.7C (80F)
- Relative humidity:
 - System on: 8 - 80 percent
 - System off: 20 - 80 percent
- BTU output: 1,229 per hour
- Noise level: 56 db average noise rating (without printer)
- FCC class rating: B

Performance:

- 20Mb fixed disk drive:
 - Average access time: 85ms
 - Track-to-track access time: 20ms
 - 5Mb bps transfer rate
 - 512 bytes per sector
 - 17 sectors per track
 - 2,448 tracks
 - 3,600 rpm disk drive
- 5.25-inch 360Kb half-high diskette drive:
 - 48 tracks per inch
 - 80 tracks
 - 2 heads
 - Track-to-track access time: 6ms plus 15ms head settle time
 - 250K bps data transfer rate
- 3.5-inch 720Kb half-high diskette drive:
 - 135 tracks per inch
 - 2 heads
 - 300 rpm rotational speed
 - Track-to-track access time: 6ms plus 15ms head settle time
 - 250K bps data transfer rate

Storage: 5.25-inch 360Kb half-high diskette drives are standard and also available as an option for (Canada only > Models 088, 089, 267 and 268. <) Adding this option to (Canada only > Models 088 and 089 <) (which is standard with 1 5.25-inch half-high diskette drive and 1 20Mb fixed disk) produces a system unit with 3 Direct Access Storage Devices. This flexibility is also available with the 3.5-inch 720Kb half-high diskette drive, an option which supports the advantages of 3.5-inch diskettes. The 20Mb fixed disk drive and 20Mb fixed disk drive adapter are available as options for (Canada only > Models 267, 268, 277 and 278. <) (Canada only > Models 267 and 268 have 1 5.25-inch 360Kb half-high diskette drive and Models 277 and 278 have 2. A maximum of 2 diskette drives and 1 fixed disk can be resident in the system unit.

Memory: These models also have the capability of increasing memory on the planar board to 640Kb. Models 267, 268, 277, and 278 are standard with 256Kb and Models 088 and 089 are standard with 640Kb. A 256Kb Memory Module Kit may be added to Models

267, 268, 277, and 278 to increase planar memory to 512Kb. A 128Kb Memory Module Kit may be added to Models 267, 268, 277, and 278 to increase planar memory to 640Kb. On Models 267, 268, 277, and 278, the 256Kb Memory Module Kit must be installed before adding the 128Kb Memory Module Kit. < >

Expansion Slots: The 5160 Models (Canada only > 088, 089, 267, 268, 277, and 278 <) contain 8 option (feature) slots. These slots allow the addition of feature cards to support additional features or memory. 6 of these slots will accept full-size feature cards 1 of which is occupied by the Diskette Drive Adapter, standard on all models. The (Canada only > Models 088 and 089 have <) another full-size feature slot occupied by the 20Mb Fixed Disk Drive Adapter. There are 2 smaller, special-feature slots 1 of which is designed to accept the Asynchronous Communications Adapter Card, which is standard on (Canada only > Models 088 and 089. < >

Keyboard: The Enhanced Personal Computer Keyboard is attached (Canada only > to 5160 Models 089, 268, and 278 <) via a 9-ft coiled cable (detachable), permitting adaptation to a variety of work environments. It is a 101-key keyboard for the U.S. marketplace and a 102-key keyboard for most non-US countries. The Enhanced Personal Computer Keyboard for the 5160 does not have indicator lights.

The 101-key US keyboard and 102-key non-US keyboard differ only in the typing section. The US keyboard is arranged similar to the Selectric(TM) keyboard layout, but with 47 graphic character keys. The tab, caps-lock, shift, enter, and backspace keys have a larger striking area and are located in their familiar Selectric locations. 1 control (CTRL) and 1 alternate (ALT) key are placed on each side of the space bar. The typing section and the numeric pad have home row identifiers for the touch typist.

The typing section of the non-US keyboard has a layout which meets the International Standards Organization (ISO) standard. It has 48 graphic character keys and vertical enter key. An alternate graphic (ATLGR) key on the right side of the space bar provides the ability to assign additional graphic characters to the keys.

The cursor and screen control keys have been separated from the numeric pad, and therefore, the numeric pad can be dedicated to numeric input. A division sign key and an additional enter key have been added to the numeric pad. The numeric pad may also be used for cursor and screen control, when not in numlock mode, as with the current IBM Personal Computer keyboards. The cursor control keys are arranged as an inverted T arrangement. The insert, delete, home, end, page up and page down keys are located above the dedicated cursor keys.

The function keys are located across the top of the keyboard. The escape key (ESC) is isolated at the upper left of the keyboard. 2 additional function keys are provided (F11 and F12). The function keys are spaced in groups of 4. Dedicated print screen/sys req, scroll lock and pause/break keys are provided for commonly used functions.

A microprocessor in the keyboard handles the system unit interface protocol, scan code generation and command processing. The microprocessor also provides a diagnostic mode which allows the operation of the keyboard to be checked without requiring a diagnostic program in the system unit.

HIGHLIGHTS

- 5.25-inch 360Kb half-high diskette drives, standard
- Enhanced Personal Computer keyboard
- (Canada only > 640Kb planar maximum memory capability < >
- (Canada only > 512Kb Standard on Models 088 and 089 < >
- 3.5-Inch 720Kb half-high diskette drive option

Standard Features: The 5160 Models (Canada only > 088, 089, 267, 268, 277, and 278 <) System Unit/Keyboard includes the following standard features:

- Intel 8088 Microprocessor
- 4.77M Hz clock speed
- (Canada only > IBM Personal Computer XT Keyboard (Models 088, 267, and 277) < >
- Enhanced Personal Computer Keyboard (Canada only > (Models 089, 268, and 278) < >
- 64Kb x 8 ROM
- ROM-based automatic power-on self-test of system components
- ROM-based BASIC language interpreter
- (Canada only > 256Kb memory on Models 267, 268, 277, and 278
- 640Kb memory on Models 088 and 089
- 256Kb x 1 memory modules standard on system board
- 640Kb planar maximum memory capability < >
- 8 expansion slots
- Diskette drive adapter
- 5.25-inch 360Kb half-high diskette drive
- 20Mb fixed disk drive adapter on (Canada only > Models 088 and 089 < >
- 20Mb fixed disk drive on (Canada only > Models 088 and 089 < >
- Fixed disk-in-use indicator light (red) on (Canada only > Models 088 and 089 < >
- Programmable speaker (can be used to produce tones)
- Parity checking
- 250ns ROM access time
- 250ns ROM cycle time
- 130 watt power supply, cooling fan

Publications: (Canada only > The following publications will be included with each system unit shipped:

- IBM Personal Computer XT Guide to Operations (P/N 6280085): "Exploring the IBM Personal Computer XT" diskette is included in the Guide to Operations.

Additional publications available for purchase:

- Technical Reference Manual is for programmers, engineers, and others who want to understand the IBM Personal Computer XT in greater detail. This reference manual includes functional specifications, BIOS listings, hardware specifications, and printouts for peripheral connectors.
- Technical Reference Options and Adapters Manual (#2509, P/N 6322509) includes functional specifications for programmers, engineers, and others who want to understand IBM Personal Computer options and adapters in greater detail.
 - 3.5-inch 720Kb Diskette Drive (P/N 6280090 - #3090)
 - 5.25-inch 360Kb Diskette Drive (P/N 6280093 - #3093)
 - 20Mb Fixed Disk Drive (P/N 6280091 - #3091)
 - 20Mb Fixed Disk Adapter (P/N 6280092 - #3092)
- Hardware Maintenance and Service (P/N 6280087): This publication for service personnel details many aspects of troubleshooting the machine. It includes instructions for identifying the failure of a replaceable unit and a parts catalog. It also includes the Advanced Diagnostics Diskette.
 - HMS Update (P/N 6280109 - #3109)
 - HMS 3.5-inch Diskette Drive Update (P/N 6280159 - #3063)
- Hardware Maintenance and Reference (HMR) Manual (P/N 6280088 - #3088): This publication for service personnel details shows the locations of the various components in the IBM Personal Computer family and the information needed to remove, replace, and adjust any of the field-replaceable units.
 - HMR Update (P/N 6280108 - #3108)
 - HMR 3.5-inch Diskette Drive Update (P/N 6280160 - #3064)
- BASIC Reference Manual (P/N 6361132) < >

Publications available at a fee for the IBM Personal Computer 1200 bps Modem are:

- "Guide to Operations" (SA27-3718) provides information and instructions for operating the modem. It includes information for planning and site preparation, instructions for modem installation and check-out, and procedures for customer problem determination. A Diagnostic Diskette for customer use in identifying/isolating a problem to the system unit of the IBM

Personal Computer is included with the guide. The "Guide to Operations" will be shipped with each modem.

- "Technical Reference Manual" (SA27-3719) is intended for programmers and engineers involved in hardware and software design and for designers and interested persons who have a need to know how the modem is designed and works.
- "Hardware Maintenance and Service Manual" (SA27-3720). Included with this manual is a Service Diagnostic Diskette. This manual provides step-by-step instructions for identifying/isolating a problem to the IBM Personal Computer 1200 bps Modem.

Publications available at a fee for the IBM Personal Computer 2400 bps Modem (#4829) are:

- "Guide to Operations" (SA27-3739) provides information and instructions for operating the modem. It includes information for planning and site preparation, instructions for modem installation and check-out, and procedures for customer problem determination. A Diagnostic Diskette (5.25-in.) for customer use in identifying/isolating a problem to the system unit of the IBM Personal Computer is included with the guide. The "Guide to Operations" will be shipped with each modem.
- "Technical Reference Manual" (SA27-3740) is intended for programmers and engineers involved in hardware and software design and for designers and interested persons who have a need to know how the modem is designed and works.
- "Hardware Maintenance and Service Manual" (SA27-3741). Included with this manual is a Service Diagnostic Diskette. This manual provided step-by-step instructions for identifying/isolating a problem to the IBM Personal Computer 2400 bps Modem (#4829).

SPECIFY (NONE)

SPECIAL FEATURES

PC Network Adapter (#0213): Allows the 5160 to be connected to form an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at a 2M bps. Each PC in the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor, an Intel 82586 network controller, a fixed-frequency modem, and network microcode that offloads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75M Hz transmit frequency and a 219M Hz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The Network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network Adapter is provided with a 9-foot cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1,000 feet from the 5178 unit. Limitations: Each user who is to share an application program on a PC Network must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit; DOS Version 3.1 or later if the PC Network Program is to be used. Maximum: 1. Customer Setup: Yes.

PC Network Base Expander (#0230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to 8 Short Distance Kits, Medium Distance Kits, and/or Long Distance Kits in any combination to further extend the distance between the PC with

the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

Math Co-Processor Option (#1002): Provides for the addition of the Intel 8087 Processor as a companion to the Intel 8088 to increase speed and precision in arithmetic, logarithmic, and trigonometric functions. The Option Kit provides a matched Intel 8088 along with the Intel 8087 to ensure high performance. The Intel 8087 multiplies 32-bit and 64-bit floating point numbers approximately 80 times faster than the Intel 8088. This option is supported only by IBM Personal Computer APL and by the Macro Assembler "escape" instruction. Maximum: 1. Field Installation: Yes. The customer is responsible for ensuring that the Math Co-Processor Option is installed by a technically skilled person. It is recommended that IBM or an IBM-authorized Personal Computer Dealer install this option.

Enhanced Graphics Adapter (Canada only) (#1200): Provides a 9-pin connector on the end of the card for a display that presents a direct-drive RGB (Red, Green, Blue) signal. This adapter contains 64Kb of graphics memory. It supports 4 colors at a resolution of 640 pels x 350 pels, an 8 x 14 character box for color text, and 256 characters in text mode. A character generator can be loaded from RAM to allow any set of 256 characters to be used. 1 light-pen can be attached to this adapter in addition to 1 display via the P-2 connector (6-pin Berg strip on the side of the card). This adapter provides support for 1 of the following: 5154 Enhanced Color Display, 5151 Monochrome Display, 5153 Color Display or another direct-drive display. 2 modes are supported by the Enhanced Graphics Adapter - the enhanced mode which is required for the 5154 Display if it fits 640 x 350 resolution and selection from up to 64 colors are to be used and - the enhanced display emulation mode which supports the 5151, 5153, and 5154 displays and all the modes provided by the Monochrome Display and Printer Adapter (plus the addition of an all-points-addressable graphics mode for the 5151 Display that is not provided by the Monochrome Display and Printer Adapter) and the Color/Graphics Adapter (plus certain graphics support for the 5153 Display that is not provided by the Color/Graphics Adapter (16 colors for 40 columns in 320 x 200 resolution and 16 colors for 80 columns in 640 x 200 resolution). Limitations: Composite video support for the attaching analog monitors or TV sets is not provided. A light-pen is not supported when the Enhanced Graphics Adapter is used with the 5151 Display. This Adapter cannot be installed in the 5161 Expansion Unit. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Graphics Memory Expansion Card (Canada only) (#1201): Provides 64Kb of graphics memory for a total of 128Kb on the Enhanced Graphics Adapter to support up to 16 colors at the 640 x 350 resolution and up to 512 text characters. With the Graphics Memory Module Lit (Canada only) (#1203), the Enhanced Graphics Adapter (Canada only) (#1200), with the Graphics Memory Expansion Card will support up to 1,024 characters (up to 8 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (Canada only) (#1200), plus any prerequisites of that feature. Maximum: 1. Customer Setup: Yes.

Graphics Memory Module Kit (Canada only) (#1203): Provides 128Kb of graphics memory for a total of 256Kb on the Enhanced Graphics Adapter (Canada only) (#1200), with the Graphics Memory Expansion Card (Canada only) (#1201), to support up to 1,024 characters (up to 8 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (Canada only) (#1200), with the Graphics Memory Expansion Card (Canada only) (#1201), plus any prerequisites of those feature. Maximum: 1. Customer Setup: Yes.

Binary Synchronous Communications Adapter (#1204): The BSC Adapter provides an EIA RS-232-C interface. A maximum of 2 BSC Adapters may be installed. Only 1 BSC Adapter may be installed if an SDLC Adapter is installed. Customer Setup: Yes.

SDLC Communications Adapter (#1205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only 1 SDLC Adapter may be installed. Customer Setup: Yes.

Cluster Adapter (#1206): (NO LONGER AVAILABLE) Permits the 5160 to be included in a cluster of interconnected personal computers which can include an IBM (Canada only> PCjr, <) 5150, 5155, 5160, 5170, XT/370, AT/370, and 5531 Industrial PC. The clustered IBM Personal Computer configuration utilizes baseband signaling and carrier sense multiple access with collision avoidance (CSMA/CA) access protocol. The topology of the interconnection is a bus environment using 75-ohm coaxial cable. The data transmission is 375K bps. The Cluster Program is provided to support up to 64 PCs in a clustered configuration. This program permits small work groups in schools and businesses to exchange messages and data files and optionally to share a fixed disk that contains programs. Messages and files can be transferred between any 2 PCs in the cluster and a message can be broadcast from 1 PC to all other PCs in the cluster. When a fixed disk is to be shared, the PC in the cluster with the fixed disk must be designated as a disk server. When a disk server PC is defined, a download option is made available which will permit downloading DOS, the cluster program, and an application program from the disk server PC to a remote PC in the cluster when the remote computer is powered on. Limitations: Each user who is to share an application program on a cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit. If the 5160 is designated as the disk server computer, it must have 256Kb of memory and 1 fixed disk. The cluster program requires a maximum of 29Kb of resident memory except when the PC is utilized as a disk server when a maximum of 136Kb of memory is required. DOS requirements must be added to the cluster program size to determine the memory available for application programs. Maximum: 1. Customer Setup: Yes.

Cluster Cable Kit (#1207): Is used to interconnect the first 2 PCs in an IBM PC cluster and attaches to the Cluster Adapter (#1206). Each PC in the cluster after the first 2 also requires a cluster cable kit. The Cluster Cable Kit provides a main coaxial cable bus of approximately 32 feet, 2 cable drops approximately 9 feet each for attachment to the main coaxial cable and to the BNC connectors of a cluster adapter, 2 BNC T-connectors for attaching the cable drops to the main coaxial cable and 2 terminating plugs. Maximum: 1.

(Canada Only> IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power-On Self-Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3m coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <)

(Canada Only> IBM PC Network Adapter II supports US English and National Languages for UK English, French, German, Italian, and Spanish. <)

- (Canada Only> A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL). <)

- (Canada Only> National Language Support for English, German, French, Spanish, and Italian. <)

(Canada Only> Specified Operating Environment

- Machine requirements

IBM PC Network Adapter II requires a full-size adapter slot in 1 of the following system units:

- IBM 8530 Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <)

(Canada only> IBM PC Network Baseband Adapter (#1221, P/N 1501221): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30 (8530).

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to 8 workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to 10 daisy chains with 8 workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <)

(Canada Only> IBM PC Network Baseband Adapter supports US English and National Languages for UK English, French, German, Italian, and Spanish. <)

- (Canada Only> A feature card for IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.
- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than 8 nodes. <)
- (Canada Only> National Language Support for English, German, French, Spanish, and Italian. <)

(Canada Only> Specified Operating Environment

- Machine Requirements

IBM PC Network Baseband Adapter requires a full-size adapter slot in 1 of the following system units:

- IBM 8530 Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:
 - IBM LAN Support Program (P/N 83X7873).
 - IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
 - IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

Game Control Adapter (#1300): Provides support for 2 customer-supplied joysticks for video game interaction, allowing the user to move an object on the screen in any direction, or it supports up to 4 customer-supplied game "paddles" for simple horizontal or vertical movement. Maximum: 1. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature system expansion slot. Customer Setup: Yes.

Prototype Card (#1400): Professional engineers or hobbyists may utilize the Prototype Card as a base for building and testing custom attachments to the system. The Prototype Card is designed to plug into 1 of the 5160's full-feature expansion slots. It is a full-size, high-quality circuit board. Circuitry and module holes are provided for interface with the IBM bus. A bracket is included to secure the card in the 5160 with a cut-out provided for up to a 37-pin external connector. Detailed instructions and component identifications are included for I/O decode attachment logic. Technical Information: Physical dimensions - 107mm (4.2 in.) high x 335mm (13.2 in.) long -- completely etched and drilled with plated-through holes -- pre-printed circuitry for interface to IBM bus -- attachment bracket and screws included -- block diagram and I/O decode logic description included. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Professional Graphics Controller (#1501): Is required to attach the 5175 Professional Graphics Display to a 5160. The 5175 Display together with the Professional Graphics Controller offers more colors and a higher resolution than the 5154 Enhanced Color Display with the Enhanced Graphics Adapter and provides high-quality color graphics capabilities for a wide range of specialized applications. The Professional Graphics Controller provides 2 models: Expanded graphics for full support of the 5175 Professional Display and Color/Graphics Monitor Adapter emulation. It offers 640 x 480 resolution for expanded graphics mode and 640 x 400 for emulation mode as well as 256 colors from a palette of 4,096 for expanded graphics mode. There is built into the Controller 2-dimensional and 3-dimensional capability for drawing, rotating, translating and scaling. An Intel 8M Hz 8088 microprocessor is provided for high-performance graphics operations and the Controller provides 320Kb of display storage. Additionally, the controller has 64Kb of graphics microcode that reduces the need to load software routines to support key graphics activities. Limitations: When the Professional Graphics Controller is installed together with the Color/Graphics Monitor Adapter, the Professional Graphics Controller must operate in expanded graphics mode. Prerequisites: 2 adjacent full-feature slots in the 5160. Maximum: 1. Customer Setup: Yes.

Data Acquisition and Control Adapter (#1502): Provides analog input and output channels and digital input and output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis, and quality control testing in laboratory, pilot plant, or full-scale production lines. The adapter provides 4 analog input channels with throughput to memory at 15,000 conversions per second, 2 analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of option for analog input and output channels and programmed I/O mode for digital input and output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Limitations: All adapters must be installed as a group in either the system unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit for each adapter desired. Maximum: 4. Customer Setup: Yes.

General Purpose Interface Bus Adapter (#1503): Provides an interface between an IBM Personal Computer and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters, and disk drives). The

adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300K bps and programmed I/O data rate of up to 10K bps. It allows the user to select interrupt level and memory access channels. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit or in the 5161 unit for each adapter desired. Maximum: 4. Customer Setup: Yes.

Data Acquisition and Control Adapter Distribution Panel (#1504): Provides easy access to the I/O signals, voltages, and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34 inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with 4 barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change, or remove the instruments and/or control points being used. Field Installation: Yes. Prerequisites: An Adapter Acquisition and Control Adapter for each panel desired. Maximum: 4. Customer Setup: Yes.

Communications Adapter Cable (#2067): The Communications Adapter Cable feature supports the attachment of the modem to the BSC adapter or SDLC adapter card connector at the rear of the 5160. The cable is double-shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. This cable is required to connect the BSC or SDLC adapter to an external modem or other data communications equipment.

Asynchronous Communications Adapter (#2074): Provides a channel to data processing or input/output devices outside of the immediate system. Such devices can be connected by telephone using a plug-in modem, or directly by cable when the device is nearby. The communication "target" may be a large host computer, a Series/1, another 5150/5160, a paper tape reader, a communicating typewriter, a laboratory instrument, or other machines providing the popular RS-232-C asynchronous interface. The Asynchronous Communications Adapter is a standard feature on the 5160 Model 088 and 089. This adapter is flexible enough to match most of the computers and related products available in the microcomputer marketplace. The user's program selects the appropriate speed (50-9600 bps), format (5-, 6-, 7-, or 8-bit characters), parity and stop bits to reflect the attached device. Once communication has been established, the user's program performs reads and writes. Interrupts permit the program to perform data processing such as calculating, diskette reading or writing, or printing, and then pause to resume communications when a signal appears on the line. The adapter provides an EIA RS-232-C interface. 1 25-pin "D" shell, male-type connector is provided to attach various peripheral devices. In addition, a current-loop interface is located in the same connector. A jumper block is provided to select manually either the voltage or the current-loop interface. Maximum: 2. Cable: A user-supplied communication cable is required for connection of external modems or other devices to the Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature system expansion slot is required. Customer Setup: Yes.

3278/3279 Emulation Adapter (#2507): Expands the capabilities of the 5160 by providing coaxial cable attachment to the 3274/76 Control Unit, the 4321, 4331 or 4361 Processor Display/Printer Adapter, or the 4361 Workstation Adapter, or the 4701 Finance Communication Controller, or the 9370 Workstation Adapter. When used with the IBM Personal Computer 3278/79 Emulation Control Program (6024134), or IBM Personal Computer Virtual Machine/Personal Computer (VM/PC 6024175 #4175), the 5160 can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A and can also support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS session can be active concurrently and the user can interact with either session alternately. Maximum: 1. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5160 system unit full-feature expansion slot is required. A customer-supplied coaxial cable is required for host system attachment. Software such as the Personal Computer 3278/79 Emulation

Control Program or IBM Personal Computer Virtual Machine/Personal Computer (VM/PC) (6024175 #4175) is required. A 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5865-311 for MVS/TSO) or equivalent is required to allow for file transfer. File transfers with VM hosts is provided with VM/PC. File transfers with MVS/TSO hosts is provided with VM/PC if TSO Host Server (5798-DTL) is installed on the MVS system. For attachment to the 4321 or 4331, specify code #9843 must be installed in the 4321 or 4331. For attachment to the 4701, the Device Cluster Adapter (#3101) must be installed on the 4701. For attachment to the 9370, specify code #6020 must be installed. Limitations: File transfer is supported on the 4701 only with the IBM 4700 Personal Computer Application Services Program Product (P/N 6934406). For additional information, limitations, and prerequisites, see Product Announcement dated October 18, 1983.

(Canada only> Enhanced Display Station Emulation Adapter (#2871): Permits a 5160 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Model 12; or remotely via the 5294 Remote Control Unit to emulate a 5250 Emulation Program. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 5160 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 5160 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. 1 or 2 host sessions and one personal computer session can be active concurrently. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5160 unit. Maximum: 1. Customer Setup: Yes.<)

3.5-Inch 720Kb Diskette Drive (#3258): This feature is a half-high, double-sided, 3.5-inch diskette drive that supports the 3.5-inch media with 720Kb storage capacity. The purpose of this option is to provide data transfer between 5.25-inch and 3.5-inch media. This allows more compatibility with other IBM equipment, including the 5140 PC Convertible that uses 3.5-inch diskettes.

The drive uses the Diskette Drive Adapter that is standard on the new models of the IBM Personal Computer XT. The drive requires the IBM Disk Operation System (DOS), Version 3.2, must be installed as drive B of the system unit.

Since you will have unlike diskette drives installed, special considerations are required if a backup copy or working copy of 5.25-inch diskette is required. The reason for this is that the working or backup copy will be on a 3.5-inch diskette that cannot be used in drive A since drive A is a 5.25-inch diskette drive. For additional information, see your IBM Authorized Dealer or your IBM Marketing Representative. Prerequisites: Diskette Drive Adapter (standard on all models). DOS 3.2 or higher is required. Maximum: 1. Customer Setup: Yes.

5.25-Inch 360Kb Diskette Drive (#3325): This option allows the 5160 Models (Canada only> 088, 089, 267, 268, 277, and 278<) to read and write data on both sides of 5.25-inch diskette. Formatted storage capacity is approximately 360Kb of data. 1 drive is standard on (Canada only> Models 088, 089, 267, and 268<) 2 are standard on (Canada only> 277 and 278.<) It may be installed as an option on (Canada only> Models 088, 089, 267, and 268.<) Prerequisites: Diskette Drive Adapter (standard on all models). Maximum: 2.

20Mb Fixed Disk Drive (#3326, P/N 6450326): This is a direct access storage device that can store up to 20Mb of formatted data. The average access time is 85ms. It is standard on (Canada only> Models 088 and 089<) and is available as an option for (Canada only> Models 267, 268, 277, and 278.<) Space and power are provided in Models 267, 268, 277, and 278 for this drive. Prerequisites: A 20Mb Fixed Disk Drive Adapter (#6450327) must be installed. Maximum: 1. Customer Setup: Yes.

20Mb Fixed Disk Drive Adapter (#3327, P/N 6450327): Provides the buffering, error detection and data transfer between the 20Mb Fixed Disk Drive and the 5160 Models (Canada only> 088, 089, 267, 268, 277, and 278.<) It is standard on (Canada only> Models 088 and 089<) and is available as an option for (Canada only> Models 267, 268, 277, and 278.<) Prerequisites: A full-size system expansion slot. Maximum: 1. Customer Setup: Yes.

(Canada only> 128Kb Memory Module Kit (#3336): Provides a 128Kb increment of parity-checked random access memory which

may be plugged into sockets on the system board to increase memory to 640Kb. Prerequisites: The 256Kb Memory Module Kit must first be installed on Models 267, 268, 277, and 278. Available sockets on the system board of Models 267, 268, 277, and 278 also required. Maximum: 1. Customer Setup: Yes.

256Kb Memory Module Kit (#3337): Provides a 256Kb increment of parity-checked random access memory which may be plugged into sockets on the system board to increase memory to 512Kb. This kit is available as an option only for Models 267, 268, 277, and 278. Prerequisites: Available sockets on the system board of Models 267, 268, 277, and 278. Maximum: 1. Customer Setup: Yes.<)

IBM Token-Ring Network PC Adapter (#3391): Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS), and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitations: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

2Mb Expanded Memory Adapter (#3905, P/N 2685193): Provides 2Mb of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30. The 2Mb Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to 2 PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel, and Micro-Soft.

The 2Mb Expanded Memory Adapter may be installed in any full-length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT, or Personal System/2 Model 30. However, a double-socketed (16-bit) bus slot is recommended for the Personal Computer AT and 3270 Personal Computer AT to enable the 2Mb Expanded Memory Adapter to achieve optimum performance.

The 2Mb Expanded Memory Adapter will backfill conventional memory from the 256Kb address to the 640Kb address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to 2 PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2Mb Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16Kb increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2Mb) through 4 16Kb pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: 1 2Mb Expanded Memory Adapter. Field Installation: Yes.

(Canada only> Personal System/2 Display Adapter (#4050, 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of 1 of the following displays: 8503, 8512, 8513, and 8514.

Voice Communications Option (#4771): The Voice Communications Option adds specialized processing capability to digitize and proc-

ess voice (audio) and telephony signals. Functions are Voice Record/Playback, Voice Recognition, Text-To-Speech, Telephony (including touch-tone signal recognition and generation), and Asynchronous Communications protocol and modem capability. The included adapter is programmable and the functions are loaded from system memory. Information can be processed from PC memory, attached microphone, telephone, and 2 telephone lines, and output to memory, telephone or lines, or an external audio speaker. Prerequisites: A full-feature slot is required. Maximum: 1. Customer Setup: Yes.

IBM Personal Computer 1200 bps Modem (#4805): Provides the capability to transmit data in duplex mode over the public switched telephone network in asynchronous mode at speeds up to 1200 bps. Compatibility: The 1200 bps modem is compatible with the Bell 212A and 103 practice and CCITT V.22B (asynchronous only) recommendation for transmitting data over the public-switched telephone network. Compatible IBM modems are:

- Another IBM Personal Computer 1200 bps modem
- 5841 Modem, asynchronous mode only

Technical Information: See "IBM Personal Computer 1200 bps Modem" under "Bibliography" for available publications. Maximum: 1. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature card slot in the 5160 Personal Computer XT. Limitations: 1) Cannot be used in special-feature (small) card slot #J8 of the 5160. 2) Not to be used in 5161 Expansion Unit. Customer Setup: Yes. <)

IBM Personal Computer 2400 bps Modem (#4829): Provides the capability to transmit data in full-duplex mode over the public switched telephone network in asynchronous mode at speeds up to 2400 bps.

Compatibility: The 2400 bps modem feature is compatible with the CCITT V.22bis recommendations and the Bell 212A and 103 practice for transmitting data over the public switched telephone network in asynchronous mode. Compatible IBM modems are:

At a speed of 2400 or 1200 bps:

- Another IBM Personal Computer 2400 bps Modem (#4829)
- The IBM 5842 2400 bps Modem

At speeds of 0-300 or 1200 bps:

- Another IBM Personal Computer 2400 bps Modem (#4829)
- The IBM 5842 2400 bps Modem
- The IBM Personal Computer 1200 bps Modem (#4805)
- The IBM 5841 1200 Bps Modem

Technical Information: See "IBM Personal Computer 2400 bps Modem" (#4829) under "Bibliography" for available publications. Maximum: 1. Field Installation: Yes. Prerequisites: An available special feature (small) or full-feature card slot in the 5160 Personal Computer XT. Limitations: Cannot be used in special feature (small) card slot #J8 of the 5160. Not to be used in 5161 Expansion Unit. Customer Setup: Yes.

Monochrome Display and Printer Adapter (#4900): Provides for the attachment of both the 5151 Monochrome Display (Canada only> Model 001<) and the 5152 Graphics Printer Model 002. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5160. Limitations: The primary monitor/display adapter must be installed in the 5160 System unit and not in a 5161 Expansion Unit. Maximum: 1. Cable: The Printer Cable (#5612) is available to connect the 5152 Model 002 to the Monochrome Display and Printer Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Color/Graphics Monitor Adapter (#4910): Provides for the attachment of a color display to the 5160. Either a "direct-disk RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5153 Color Display (Canada only> Model 001,<) a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16 foreground and 8 background colors are supported in text (character) mode. This attachment also provides support for 4-color medium-resolution graphics (320 dots horizontal, 200 dots

vertical) and black and white high-resolution graphics (640 dots horizontal 200 dots vertical). 256 characters are available in "text" mode, 128 in medium- or high-resolution graphics. The adapter provides 16Kb or built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Limitations: The primary monitor/display adapter must be installed in the 5160 System Unit and not in a 5161 Expansion Unit. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

General Purpose Interface Bus Adapter Cable (#5040): 1 cable is required for each device attached to this adapter. Maximum: 14 per adapter.

3278/79 Emulation Adapter (#5050): Expands the capabilities of the 5160 by providing coaxial cable attachment to the 3274 and 3276 Control Unit, the 4321, 4331, or 4361 Processor Display/Printer Adapter, the 4361 Workstation Adapter, or the 4701 Finance Communication Controller. When used with the IBM PC 3270 Emulation Program, Entry Level, the 5160 can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A and can support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS Session can be active concurrently and the user can interact with either session alternately. Maximum: 1. Field Installation: Yes. Prerequisites: An available 5160 system unit full feature expansion slot is required. A customer-supplied attachment cable is required for host system attachment. Software such as the IBM PC 3270 Emulation Program, Entry Level, or other communications software is required. For file transfer, a 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required. For attachment to the 4321 or 4331, specify code #9843 must be installed on the 4321 or 4331. See "System Descriptions" for 4700 attachment prerequisites.

Printer Adapter (#5200): Provides for attachment of the 5152 Graphics Printer Model 002. This option is used when the Color/Graphics Monitor Adapter (#4910) is selected instead of the Monochrome Display and Printer Adapter (#4900), or when support for more than 1 printer is required and the Monochrome Display and Printer Adapter is already installed. The adapter provides a connector for attachment of the printer cable to the rear of the 5160. Maximum: 1. Cable: The Printer Cable (#5162) is available to connect the 5152 Model 002 to the Printer Adapter. Field Installation: Yes. Prerequisites: An available special-feature (small) or full-feature system expansion slot. Customer Setup: Yes.

(Except LAD> PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD> The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD> Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
Depth - 336mm (13.26 in.)
Height - 107.95mm (4.25 in.)
Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <

(Canada only > IBM Enhanced Graphics Adapter (EGA) Jumper Card (#6583, P/N 8575146): Provides an external synchronization from the IBM 4055 InfoWindow Display to allow overlay of text and graphics stored on the IBM Personal Computer with video stored on a video disc player. Technical Information: The IBM Enhanced Graphics Adapter Jumper Card attaches to the feature connector of the IBM Enhanced Graphics Adapter and to the IBM General Purpose Interface Bus Adapter (IRQ connector Row B, pins 2-6). Maximum: 1. Field Installation: Yes. Prerequisites: IBM Enhanced Graphics Adapter and IBM General Purpose Interface Bus Adapter. Customer Setup: Yes. Publications: Enhanced Graphics Adapter Jumper Card Guide to Operations (GA27-3744, P/N 8575145) <

4683 Model 2 Attachment Adapter Kit (#8314, P/N 83X7654): The 4683 Model 2 Attachment Adapter Kit provides the necessary adapter card, software, diagnostics, installation aid, and instructions for attaching 1 or 2 4683 Model 2 to an IBM Personal Computer XT. The kit consists of the following:

- IBM 4683 Model 2 Adapter Card and Wrap Plug
- Ship group that contains:
 - Lock Accessory Kit
 - Diskette Kit

Publications:

- IBM 4683 Model 2 Attachment Adapter Kit: Installation Guide
- IBM 4683 Model 2 Attachment Adapter Kit: Problem Determination Guide
- IBM 4680 Store System Terminal Operations Guide
- Guide to Operations IBM Personal Computer: 4683 Model 2 Attachment Adapter

The combination of the 4683 Model 2 and Attachment Adapter Kit connected to and installed on the IBM Personal Computer described in the specified operating environment provides the capability to attach up to 2 4683 Model 2 Point-of-Sale Terminals. The Attachment Kit is applicable to all small store environments where an in-store IBM Personal Computer XT and Application Program are available to meet the requirements. Limitations: Maximum of 1 Attachment Adapter. Prerequisites: An available full-feature slot in the system unit. Field Installation: Yes. Customer Setup: Yes.

(Canada only > Personal Telephone Manager Adapter (#8982): Provides a telephone channel allowing the connection of the tele-

phone to the Personal Computer for utilization of advanced telephone functions. The Personal Telephone Manager Program (6429190, #8989 of 5870-LLA) will provide advanced telephone applications. Refer to Programming Announcement dated October 15, 1985 and Product Announcement dated October 15, 1985. The "Technical Reference Manual", SC27-3657, provides adapter interface information for writing application software to enhance telephone applications. The "Personal Telephone Manager Hardware Maintenance and Service Assembly" may be obtained by ordering Form SX27-3656. Maximum: 1. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot, analog telephone (pulse or tone) and cord with modular plug, standard analog USOC, RJ11C/W, RJ12C/W, RJ13C/W wall connector, or IBM Token-Ring Network wall connector. Customer Setup: Yes. Limitation: This feature is US only. <

MODEL CONVERSIONS

(Canada only > Customer can upgrade from Model 268 to Model 089, as well as from Model 267 to Model 088 by installing the following features:

- 20Mb Fixed Disk Drive (#3326)
- 20Mb Fixed Disk Drive Adapter (#3327)
- Asynchronous Communications Adapter (#2074)
- 128Kb Memory Module Kit (#3336)
- 256Kb Memory Module Kit (#3337)

Customer can upgrade from Model 268 to Model 278, as well as from Model 267 to Model 277 by installing the following feature:

- 5.25-inch 360Kb Diskette Drive (#3325) <

ACCESSORIES

(Canada only > Enhanced Personal Computer Keyboard

- 6341707 60 clear keycaps with paper inserts
- 1351710 Blank light keycaps
- 1351728 Blank dark keycaps
- 6341704 300 paper inserts
- 1351717 6 keycap removal tools
- 6279940 3 keyboard templates <

SUPPLIES

None required with the machine order.

5161 EXPANSION UNIT

ALL MODELS OF THE 5161 AND ALL FEATURES ARE NO LONGER AVAILABLE

PURPOSE

The 5161 Expansion Unit provides additional configuration flexibility for the 5150 Personal Computer and the 5160 Personal Computer XT, or the 3270 Personal Computer. Each Expansion Unit contains at least one 10MB Fixed Disk Drive and eight option expansion slots which allow for the installation of feature cards to support additional system function. In addition, the 5161 Expansion Unit models 1 and 3 contains one Fixed Disk Drive Adapter (#2501) (NO LONGER AVAILABLE) as standard. The primary monitor/display attachment adapter, the diskette adapter, the 5160 XT/370 Option Kit, and any memory expansion options must reside in a System Unit. Other IBM attachment adapters may reside in either an Expansion Unit or System Unit. One additional 10MB Fixed Disk Drive (#2500) (NO LONGER AVAILABLE) may be installed in an Expansion Unit model 1 or 2 for a total of 20MB of fixed disk storage.

MODELS

Model 001 (NO LONGER AVAILABLE): Expansion Unit, 10MB Fixed Disk Drive, Fixed Disk Drive Adapter, attachment cards and cable for a 5150, or 5271 mdls 2 or 4.

Model 002 (NO LONGER AVAILABLE): Expansion Unit, 10MB Fixed Disk Drive, attachment cards and cable for a 5160 mdl 068, 078, 086, 087, 588, or 589, or 5271 mdl 6.

Model 003 (NO LONGER AVAILABLE): Expansion Unit, two 10MB Fixed Disk Drives, Fixed Disk Drive Adapter, one attachment card, and cable for a 5160 mdl 568.

Maximum: One per system.

Prerequisites:

- Mdl 001: A 5150 PC System Unit or 5271 mdls 2 or 4 with an available system expansion slot is required. A read-only memory (ROM) replacement kit is provided with the Expansion Unit. The kit contains a ROM module which must be used to replace one of the ROM modules in the 5150 System Unit. A tool is provided to facilitate this replacement. The ROM Kit is not required for the 5271 mdls 2 or 4.
- Mdl 002: A 5160 PC XT mdl 068, 078, 086, 087, 588, or 589 System Unit or 5271 mdl 6 with an available full-feature system expansion slot is required.
- Mdl 003: A 5160 PC XT mdl 568.

Customer Setup (CSU): All mdls and special features of the 5161 Expansion Unit are customer setup.

HIGHLIGHTS

- The Expansion Unit contains eight option expansion slots. Six of the slots are full-feature slots which will accept full-feature cards. The remaining two are special-feature slots which will accept smaller-feature cards. The 5161 mdl 001 attaches to the 5150 PC or 5271 mdl 2 or 4. The 5161 mdl 002 attaches to the 5160 PC XT mdl 068, 078, 086, 087, 588, or 589 or 5271 mdl 6. The 5161 mdl 003 attaches to the 5160 PC XT mdl 568.
- The following features are supplied as standard with the 5161 Expansion Unit:

- Eight system expansion slots (one full-feature slot is required for the Fixed Disk Drive Adapter; one full-feature slot is required for the attachment card)
- 10MB Fixed Disk Drive (#2500) (NO LONGER AVAILABLE)
 - one in mdl 001 and 002
 - two in mdl 003
- Fixed Disk Drive Adapter (#2501) (NO LONGER AVAILABLE) (5161 mdl 1 and 3)
- 1m (39 in.) cable and attachment cards for connection to the System Unit
- 130 watt power supply with cooling fan

Dimensions (approximate):

Height - 142mm (6 in.)
Width - 500mm (20 in.)
Depth - 410mm (16 in.)
Weight - 12.2kg (27 lbs)

Environment:

	System On	System Off
Air Temperature:	15 to 32C (60 to 90F)	10 to 43C (50 to 110F)
Humidity:	8 to 80 per cent	20 to 80 per cent

SPECIFY

- Voltage (120V AC, 60 Hz): No specify required.

SPECIAL FEATURES

10MB Fixed Disk Drive (#2500) (NO LONGER AVAILABLE): Provides storage for user programs and data. One 10MB Fixed Disk Drive is provided as standard on the 5161 mdl 001 and 002. Technical Information: 512 bytes per sector -- 17 sectors per track -- 306 tracks per surface -- 4 surfaces -- 3,600 rpm -- 90ms average access time -- 5M bit per second transfer rate. Maximum: Two 10MB Fixed Disk Drives may be installed in the 5161. If a 5161 mdl 002 is attached to a 5160 mdl 087, 588 or 589, the 10MB Fixed Disk Drive and the Fixed Disk Drive Adapter in the 5160 must be moved into the 5161 to provide a total of 20MB of fixed disk storage (two 10MB Fixed Disk Drives) available to the system. Field Installation: Yes. Prerequisites: Fixed Disk Drive Adapter (#2501) (NO LONGER AVAILABLE). Customer Setup: Yes.

Fixed Disk Drive Adapter (#2501) (NO LONGER AVAILABLE): Provides the buffering, error detection, and data transfer between the 10MB Fixed Disk Drive (#2500) (NO LONGER AVAILABLE) and the 5150/5160. One Fixed Disk Drive Adapter is included as a standard feature on the 5161 mdl 001 and 003. The Fixed Disk Drive Adapter can attach up to two 10MB Fixed Disk Drives. When a 5161 mdl 002 is attached to a 5160 mdl 087, 588 or 589, the 10MB Fixed Disk Drive and the Fixed Disk Drive Adapter in the 5160 must be moved into the 5161 to provide a total of 20MB of fixed disk storage (two 10MB Fixed Disk Drives) available to the system. Technical Information: 32-bit error-correcting code -- microprocessor controlled -- on-board sector buffers -- internal diagnostics -- direct memory access (DMA) data transfer -- high-level command set -- automatic error detection and correction -- automatic retries on disk access. Limitations: The Fixed Disk Drive Adapter may not be installed in a 5150 expansion slot. Both the 10MB Fixed Disk Drive and the Fixed Disk Adapter must reside in the 5161 mdl 001. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5162 PERSONAL COMPUTER XT

PURPOSE

The IBM Personal Computer XT Mdl 286 enhances the IBM Personal Computer family by offering significant price performance. A standard configuration includes an Intel 80286 6 MHz microprocessor with zero wait-state, 640KB of memory, one diskette drive and one fixed disk. Extensive special features and software are available which provide compatibility with the rest of the IBM PC family as well as providing a wide variety of configuration possibilities.

MODELS

Model 286: System unit/keyboard, 80286 microprocessor at 6 MHz with zero wait-state, 640KB of memory on the planar, serial/parallel adapter, 1.2MB 5.25-inch diskette drive, 20MB fixed disk and Enhanced Personal Computer Keyboard.

Limitations: The 5161 Expansion Unit is not supported by the 5162.

Prerequisites: The 5162 requires an IBM display or equivalent and adapter IBM PC DOS users require DOS version 3.2. IBM Personal Computer XENIX Operating System users require XENIX version 2.0.

Customer Setup (CSU): The 5162 and its special features are customer setup.

HIGHLIGHTS

- High performance based on Intel 80286 microprocessor and elimination of wait-state for system memory access.
- 640K bytes of memory on the planar.
- 20 MB/85 ms fixed disk.
- One 1.2MB diskette drive (half-high).
- Five 16-bit and three 8-bit expansion slots.
- One fixed disk and diskette drive adapter (occupies a 16-bit expansion slot).
- One serial/parallel adapter (occupies a 16-bit expansion slot).
- Time and date clock with battery back-up (customer replaceable).
- Enhanced Personal Computer Keyboard with indicator lights.
- BASIC language provided.
- 157 watt universal power supply.
- Additional diskette capability (5.25-in. or 3.5-in.) may be added.
- Incremental memory is available up to a maximum of 12.6MB.
- Extensive selection of special features is available.

DESCRIPTION

The price performance of the 5162 makes it desirable for use in multi-application systems, for complex spread sheets and other business, professional and office environments where high performance is desired.

Memory may be increased to a maximum of 12.6MB. A second diskette drive may be added as the "B" drive. Selection may be made from a 1.2MB 5.25-inch drive, a 360KB 5.25-inch drive or a

720KB 3.5-inch drive. A 3.5-inch Internal Diskette Drive is mutually exclusive with the 4865 Mdl 2 3.5-inch External Diskette Drive which may also be attached to the system.

The eight expansion slots, five 16-bit and three 8-bit, are used for option cards. One 16-bit slot is required for the standard fixed disk and diskette drive adapter card. One 8-bit or 16-bit slot is required for the standard serial/parallel adapter card. The remaining six expansion slots are available to be utilized as required by the user for special features. Memory, in addition to the 640K bytes provided, may be expanded in increments of 512K to a maximum of 12.6MB.

The 5162 supports most special features, I/O devices and software associated with the IBM Personal Computer XT and AT family.

ENVIRONMENT CONSIDERATIONS

- Dimensions:
 - Length - 500mm (19.6 in.)
 - Depth - 410mm (16.1 in.)
 - Height - 142mm (5.5 in.)
 - Weight - 14.5kg (32 lbs)
- Electrical:
 - 90-137V, 57-63Hz
 - 180-265V, 47-53Hz
- Ambient Air Temperature:
 - System on: 15.6-32.2 degrees C (60-90 degrees F)
 - System off: 10-43 degrees C (50-110 degrees F)
- Humidity:
 - System on: 8-80% RH
 - System off: 20-80% RH
- BTU Output: 824 BTU/Hr
- Noise Level: Class 3 (office environment)
- FCC Class: B

Publications: The following publication will be included with each 5162 shipped. It is also available for purchase.

- "IBM Personal Computer XT Mdl 286 Guide to Operations": P/N 6280147, #3216

The following publications are available for purchase:

- "IBM Personal Computer XT Mdl 286 Technical Reference Manual": P/N 68X2210, #3210
- "Technical Reference Options and Adapters Updated": P/N 6322509, #2509
- "Fixed Disk and Diskette Drive Adapter": P/N 68X2215, #3215
- "20MB Fixed Disk Drive": P/N 68X2208, #3208

Hardware Maintenance Library:

- "IBM Personal Computer XT Type 5162 Supplement for the Hardware Maintenance Service": P/N 68X2211, #3211
- "IBM Personal Computer XT Type 5162 Supplement for the Hardware Maintenance Reference": P/N 68X2212, #3212
- "BASIC Reference Manual Version 3.2": P/N 6280075, #0075

The installation instructions for special features contain the instructions to install the features, a warranty, and FCC statement and where appropriate, basic operational instructions. These publications are shipped with the features. The "IBM Personal Computer Guide to Operations" contains exceptions to the installation instructions for certain special features and options. Refer to this publication prior to installing any special features.

SLSS is not available for any of the above publications. Purchasable publications are available through IBM or Authorized PC Dealers or the "Technical Directory" (1-800-IBM-PC7B).

SPECIFY (NONE)**SPECIAL FEATURES**

Math Co-Processor (#0211): This option is a high-performance numeric 80287 processor extension with floating point, extended integer, and BCD data types, compatible with the Intel 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

PC Network Adapter (#0213): This option allows the 5162 to be connected to an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, or the PC Local Area Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at 2M bps. Each PC on the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor and Intel 82586 network controller, a fixed-frequency modem and network microcode that off loads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75 MHz transmit frequency and a 219 MHz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network adapter is provided with a 9-ft. cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1,000 ft. from the 5178 Unit. Each user who is to share an application program on a PC Network must be licensed to use that program.

Serial/Parallel Adapter (#0215): This option provides a serial port and a parallel port. It occupies only one expansion slot of either type. The serial portion is fully programmable and supports asynchronous communications from 50 to 9600 bps. The back of the adapter has a 9-pin D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight-bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. Maximum: Two. Limitations: This adapter does not support current loop operation. The 5218 Printer is not supported.

Serial Adapter Cable (#0217): This is a 3m (10 ft) cable with a 25 pin D-shell connector providing all the signals of an EIA RS-232-C interface which can connect the Serial Adapter port to an appropriate serial device.

PC Network Short Distance Kit (#0231): Provides one-foot of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used.

PC Network Medium Distance Kit (#0232): Provides 400 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC

and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used.

PC Network Long Distance Kit (#0233): Provides 800 feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used.

PC Network Cabling Segments:

- PC Network 25-Ft. Cabling Segment (#0234)
- PC Network 50-Ft. Cabling Segment (#0235)
- PC Network 100-Ft. Cabling Segment (#0236)
- PC Network 200-Ft. Cabling Segment (#0237)

Provides four different cable length segments to attach a PC with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

Serial Adapter Connector (#0242): This adapter is a 10-inch cable with a 25-pin D-shell connector providing all the signals for an EIA RS-232 interface for connecting the Serial Adapter port to an appropriate serial device which has its own cable. Field Installation: Yes. Customer Set-up: Yes.

3.5-inch Internal Diskette Drive (P/N 6450357, #0357): This feature is a half-high, double-sided, 3.5-inch diskette drive which utilizes the 3.5-inch diskette with 720KB of storage capacity. The drive utilizes the fixed disk and diskette drive adapter which is standard on the 5162. When installed, it becomes the "B" drive. Initial Program Loading (IPL) from the 3.5-inch diskette is not supported by the 5162. DOS users will require DOS 3.2 on a 5.25-inch diskette or fixed disk for operation. Limitations: Mutually exclusive with the 4865 Mdl 2 3.5-inch External Diskette Drive. Maximum: One. Field Installation: Yes. Prerequisite: DOS Version 3.2. Customer Setup: Yes.

High Capacity Diskette Drive (P/N 6450359, #0359): This is a half-high, 5.25-inch, dual sided drive with 1.2MB of storage capacity. This drive is identical with the drive provided as standard with the 5162 in the "A" position. When installed as the second drive, it becomes the "B" drive. This drive utilizes the fixed disk and diskette drive adapter which is standard on the 5162. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

5.25-inch, 360KB Diskette Drive (P/N 6450360, #0360): This half-high, 5.25-inch diskette drive permits the exchange of information between the 5162 and other members of the IBM Personal Computer family. It is a dual sided drive with 360KB of storage capacity. When installed, it becomes the "B" drive. This drive utilizes the fixed disk and diskette drive adapter which is standard on the 5162. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

Enhanced Graphics Adapter (#1200): Provides a 9-pin connector on the end of the card for a display that presents a direct-drive RGB (Red, Green and Blue) signal. This Adapter contains 64KB of graphics memory. It supports four colors at a resolution of 640 pels x 350 pels, an 8 x 14 character box for color text, and 256 characters in text mode. A character generator can be loaded from RAM to allow any set of 256-characters to be used. One light-pen can be attached to this adapter in addition to one display via the P-2 connector (6-pin Berg strip on the side of the card). This adapter provides support for one of the following: 5154 Enhanced Color Display, 5151 Monochrome Display, 5153 Color Display or another direct-drive display. Two modes are supported by the Enhanced Graphics Adapter - the enhanced mode which is required for the 5154 Display if its 640 x 350 resolution and selection from up to 64 colors are to be used, and the enhanced display emulation mode which supports the 5151, 5153 and 5154 displays and all the modes provided by the Monochrome Display and Printer Adapter (plus the addition of an all-points-addressable graphics mode for the 5151 Display that is not provided by the Monochrome Display and Printer Adapter) and the Color/Graphics Adapter (plus certain graphic

support for the 5153 Display in 320 x 200 resolution and 16 colors for 80 columns in 640 x 200 resolution). Composite video support for attaching analog monitors or TV sets is not provided. A light-pen is not supported when the Enhanced Graphics Adapter is used with the 5151 Display.

Enhanced Graphics Adapter Memory Expansion Card (#1201): Provides 64KB of graphics memory for a total of 128KB on the Enhanced Graphics Adapter to support up to 16 colors at the 640 x 350 resolution and up to 512 text characters.

Enhanced Graphics Adapter Memory Module Kit (#1203): Provides 128KB of graphics memory for a total of 256KB on the Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card (#1201) to support up to 1,024-characters (up to eight 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data.

Binary Synchronous Communications Adapter (#1204): The BSC Adapter provides an EIA RS-232-C interface. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter is installed.

SDLC Communications Adapter (#1205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only one SDLC Adapter may be installed.

(Except LAD> IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <

(Except LAD> IBM PC Network Adapter II supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL). <
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment

- Machine requirements

IBM PC Network Adapter II requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286
- Programming requirements:

- IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

(Except LAD> IBM PC Network Baseband Adapter (#1221, P/N 1501221): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30 (8530).

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to eight workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to ten daisy chains with eight workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <

(Except LAD> IBM PC Network Baseband Adapter supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for IBM Personal System/2 Model 30 and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.
- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than eight nodes. <
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment

- Machine Requirements

IBM PC Network Baseband Adapter requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

Prototype Adapter (#1400): The Prototype Card is designed to plug into one of the full-feature expansion slots. It is a full-size, high-quality circuit board. Circuitry and module holes are provided for interface with the IBM bus. A bracket is included to secure the

card with a cut-out provided for up to a 37-pin external connector. Detailed instructions and component identifications are included for I/O decode attachment logic. The card is completely etched and drilled with plated-through holes with preprinted circuitry for interface to IBM bus. Attachment bracket, screws, block diagram and I/O decode logic description are included. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Data Acquisition and Control Adapter (#1502): Provides analog input/output channels and digital input/output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis and quality control testing in laboratory, pilot plant or full-scale production lines. The adapter provides four analog input channels with throughput to memory at 15,000 conversions per second, two analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of operation for analog input/output channels and programmed I/O mode for digital input/output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Prerequisites: An available slot in the 5162 for each adapter desired. Maximum: Four.

General Purpose Interface Bus Adapter (#1503): Provides an interface between an IBM PC and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300K bps and programmed I/O data rate of up to 10K bps. It allows the user to select interrupt level and memory access channels. FCC classification of this feature is "A". Prerequisites: An available slot in the 5162 for each adapter desired. Maximum: Four.

Data Acquisition and Control Adapter Distribution Panel (#1504): Provides easy access to the I/O signals, voltages and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34-inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with four barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change or remove instruments and/or control points being used. Prerequisites: An Acquisition and Control Adapter for each panel desired. Maximum: Four.

Communications Adapter Cable (#2067): The Communications Adapter Cable feature supports the attachment of a modem to the BSC adapter or SDLC adapter card connector at the rear of the 5162. The cable is double-shielded and approximately 3m (10 ft.) long. A wrap connector is provided to test the cable. This cable is required to connect the BSC or SDLC adapter to an external modem or other data communications equipment.

Enhanced 5250 Emulation Installation Convenience Kit (#2870): Provides the following items necessary to permit attachment of the 5162 to the S/34, S/36 or S/38:

- The Enhanced Display Station Emulation Adapter, Enhanced 5250 Emulation Program Version 2.1, integrated attachment cable, Keyboard Enhanced 5250 Emulation Program Version 2.1 template, and manuals necessary to install the Enhanced Display Station Adapter and Enhanced 5250 Emulation Program in the IBM Personal Computer.
- Allows connection of the 5162 as a peripheral to the S/34, S/36, or S/38 either as a locally connected workstation or remotely via a 5251-12. The 5162 can also attach remotely to a S/36 or S/38 via a 5294 Remote Control Unit. The 5162 in 5250 emulation mode has access to all the functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The 5162 can also operate as a stand-alone personal computer.

Maximum: One. Prerequisites: An available full-feature system expansion slot, and one of the following:

- 5151 Monochrome Display, or
- 5153 Color Display and Color/Graphics Monitor Adapter (#4910), or
- User supplied 80-column by 25-row monitor and appropriate adapter.

IBM Personal Computer Disk Operating System (DOS) 3.2 is required. For more information, limitations, and prerequisites, refer to Programming Announcement 286-026, dated January 21, 1985.

Enhanced Display Station Emulation Adapter Kit (#2871): Permits a 5162 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Mdl 12 or remotely via the 5294 Remote Control Unit to emulate a 5250 workstation. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 5162 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 5162 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. One or two host sessions and one personal computer session can be active concurrently. Field Installation: Yes. Customer Setup: Yes. Maximum: One. Prerequisites: An available full-feature slot in the 5162.

Keylock (#3177): The Keylock Feature is a simple mechanical device that can be installed on a 5162 approximately 15 minutes using a screwdriver. The keylock unit is 5-inches square, 4-inches high, and weighs less than 2 lbs.

The keylock unit is designed to be attached to the right rear corner of the 5162 over the power switch. No alteration of the 5162 or program support is required for this feature. Two keys are provided with the feature and duplicate keys can be obtained only from the lock manufacturer.

When the keylock is in the locked position, the cover removal screw of the 5162 is protected to prevent physical access to the contents. This protects against removal of the fixed disk drives as well as of the hardware installed in the 5162.

When the keylock is locked, the power-on switch on the 5162 is inoperable. In addition, if the display installed does not receive power from the 5162 unit (5153 or 5154 display, for example), the access port to the 5162 is blocked to prevent the 5162 from being powered on through the access port. Without power on, access to the 5162 configuration via a local program, by another computer via a communications link, or via another personal computer cabled to the 5162 in a local area network is not possible.

512KB Memory Module Kit (#3338): This feature provides an additional 512KB memory on the 512KB/2MB Memory Expansion Option (#3343). Prerequisite: One or more 512KB/2MB Memory Expansion Options #3343.

512KB/2MB Memory Expansion Option (#3343): This feature comes with 512KB of memory on the card. With additional 512KB Memory Module Kits (#3338), this card can be expanded up to 2MB of system unit memory (the base card plus three Memory Module Kits).

A maximum of four 512KB/2MB Memory Expansion Options can be installed in the system unit. A total of 8.6MB of user memory is possible, with 640KB of planar memory plus 8MB of memory options (four cards times 2MB/card).

To install the fourth option, the Serial/Parallel Adapter card must be removed from its 16-bit expansion slot. The Monochrome Display and Printer Adapter (#4900) can be installed in the end, 8-bit expansion slot to provide printer and display output.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Personal Computer with a network adapter to the IBM Cabling System or directly to an access unit.

Token-Ring Network PC Adapter (#3391): The IBM Token-Ring PC Adapter is a feature card for the IBM Personal Computer. The adapter contains a microprocessor operating under control of adapter resident microcode. The adapter transmits and receives at a speed of 4M bps using protocols conforming to IEEE 802.5 and

ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard. Diagnostics invoked during adapter initialization verify the adapter operation and check-out the cabling to the access unit. The adapter detects permanent errors, such as loss of receive signal, and generates a notification signal to initiate automatic network recovery. Recoverable errors, such as bit errors in the transmitted message, are detected by the adapter for subsequent reporting to a ring diagnostic program.

A diskette is included with the adapter, and supports the operation and testing of the adapter and network. The adapter handler program provides a programming interface for the adapter. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as an aid in problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented.

A supplement to the "IBM Personal Computer Guide to Operations" is included with the adapter. It contains installation instructions for the adapter and adapter support programs. Prerequisite: An IBM Token-Ring Network PC Adapter Cable (#3390) is required for connecting this feature to the Token-Ring Network.

Memory Expansion Adapter (P/N 55X3560, #3395): A versatile multifunction card providing up to 3MB of memory, a parallel printer port and an asynchronous serial communications port. The adapter is provided with 512KB of memory installed. Memory Module Kits can be added in increments of 512KB up to a maximum of 3MB per adapter. A maximum of four adapters may be installed providing up to 12MB of additional memory. Split memory addressing allows the base memory to be filled up to the 640KB limit. Additional memory automatically becomes part of the expansion memory area. The asynchronous serial communications port is an RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. The parallel printer port provides a 25-pin connector to attach a parallel printer. Limitations: The 5162 can support a maximum of two serial devices and two parallel printers. Unused ports can be disabled by the user. Maximum: Four adapters.

To install the fourth option, the Serial/Parallel Adapter card must be removed from its 16-bit expansion slot. The Monochrome Display and Printer Adapter (#4900) can be installed in the end, 8-bit expansion slot to provide printer and display output. Field Installation: Yes. Prerequisite: One 16-bit expansion slot per adapter. Customer Setup: Yes.

Memory Module Kit (P/N 55X3547, #3397): Expands the memory capacity of the Memory Expansion Adapter (#3395) in increments of 512KB up to a maximum of 3MB per adapter (512KB is provided with the adapter). Each kit consists of two memory modules (256K each) which must be inserted into memory module sockets on the adapter card. A fully populated Memory Expansion Adapter would contain five Memory Module Kits and provide 3MB of memory. Maximum: Five per adapter card. Field Installation: Yes. Prerequisite: Memory Expansion Adapter (#3395). Customer Setup: Yes.

Memory Expansion Adapter (P/N 55X3679, #3400): A versatile multifunction adapter providing up to 6MB of memory, split memory addressing, a parallel printer port and an asynchronous serial communications port. The adapter is provided with 1MB of memory installed. Memory Module Kits can be added in increments of 1MB up to a maximum of 6MB per adapter. Three adapters may be installed providing a maximum of 18MB of additional memory. Split memory addressing allows the base memory to be filled up to 640KB limit. Additional memory automatically becomes part of the expansion memory area. The asynchronous serial communications port is an RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. The parallel printer port provides a 25-pin connector to attach a parallel printer. Limitations: The 5170 and 5162 can support a maximum of two serial ports and two parallel ports. Maximum: Three adapters and 18MB of memory. Field Installation: Yes. Prerequisites: One 16-bit expansion slot per adapter. Customer Setup: Yes.

Memory Module Kit (P/N 55X3681, #3402): Expands the memory capacity of the Memory Expansion Adapter (#3395 or #3400) in in-

crements of 1MB up to a maximum of 6MB per adapter. (1MB is provided with the adapter.) Each kit consists of two memory modules (512KB each) which must be inserted into memory module sockets on the adapter card. A fully populated Memory Expansion Adapter would consist of five Memory Module Kits and provide 6MB of memory. Limitations: The 1MB Memory Module Kit (#3402) can be used only with Memory Expansion Adapters #3395 and #3400. This 1MB Memory Module Kit (#3402) can only be combined with the 512KB Memory Module Kit (#3397) in a specific configuration. Maximum: Five per adapter card. Field Installation: Yes. Prerequisites: Memory Expansion Adapters (#3397 and #3400). Customer Setup: Yes.

5364 Driver Card (#4548): Allows connection of the S/36 5364 System Unit. See the 5364 Sales Manual pages for additional information.

The 5364 Driver Card is shipped with the 5364.

Prerequisite: The 5364 attachment Code provided with System/36 SSP (5727-SS6). Release 4 requires PTF #04489 to be installed in the directly attached PC. Without this PTF, false hardware errors may occur.

Voice Communications Option (#4771): The Voice Communications Option adds specialized processing capability to digitize and process voice (audio) and telephony signals. Functions are Voice Record/Playback, Voice Recognition, Text-to-Speech, Telephony (including touch-tone signal recognition and generation), and Asynchronous Communications protocol and modem capability. The included adapter is programmable and the functions are loaded from system memory. Information can be processed from PC memory, attached microphone, telephone, and two telephone lines, and output to memory, telephone or lines, or an external audio speaker. Prerequisites: A full-feature slot is required. Maximum: One.

IBM Personal Computer 1200 bps Modem (#4805): Provides the capability to transmit data in duplex mode over the public switched telephone network in asynchronous mode at speeds up to 1200 bps.

Compatibility: The 1200 bps modem is compatible with the Bell 212A and 103 practice and CCITT V.22B (asynchronous only) recommended for transmitting data over the public switched telephone network. Compatible IBM modems are:

- Another IBM Personal Computer 1200 bps Modem.
- The IBM 5841 Modem, asynchronous mode only.

Technical Information: The publication "Guide to Operations for the IBM Personal Computer 1200 bps Modem," (SA27-3718), provides information and instructions for operating the modem. It includes information for planning and site preparation, instructions for modem installation and check-out, and procedures for customer problem determination. A Diagnostic Diskette for customer use in identifying/isolating a problem to the system unit of the IBM Personal Computer is included with the guide. The "Guide to Operations" will be shipped with each modem. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature card slot in the 5162. Limitations: None. Customer Setup: Yes.

IBM Personal Computer 2400 bps Modem (P/N 6164829, #4829): This feature supports asynchronous data transmission at speeds of up to 2400 bps on a point-to-point basis over public switched telephone lines in full-duplex mode. CCITT V.22B is recommended at speeds of 2400 or 1200 bps. Bell 212A practice at a speed of 1200 bps and Bell practice 103 at speeds of 0 to 300 bps. See Product Announcement Letter 186-147, August 5, 1986 for additional information.

Monochrome Display and Printer Adapter (#4900): Provides for the attachment of the 5151 Monochrome Display Mdl 001 and one of the supported printers, 4201 Proprinter Mdl 001, 3852 Color Jetprinter Mdl 002, 5201 Quietwriter Printer, 5216 Wheelprinter Mdl 002 or any compatible printer. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5162. Maximum: One.

Color/Graphics Monitor Adapter (#4910): Provides for the attachment of a color display to the 5162. Either a "direct-drive RGB" signal or a "composite" video signal can be selected.

The display can be a direct-drive 5153 Color Display Mdl 001, a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. Sixteen foreground and eight background colors are supported in text (character) mode. This attachment also provides support for 4-color medium resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 x 200). 256 characters are available in "text" mode, 128 in medium- or high-resolution graphics. The adapter provides 16KB of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Prerequisites: An available full-feature system expansion slot. Maximum: One.

3278/79 Emulation Adapter (#5050): Expands the capabilities of the 5162 by providing coaxial cable attachment to the 3274 and 3276 Control Unit, the 4321, 4331 or 4361 Processor Display/Printer Adapter, the 4361 Workstation Adapter, or the 4701 Finance Communication Controller. When used with the IBM PC 3270 Emulation Program, Entry Level, the 5162 can emulate the functions of a 3278 Display Station Mdl 2 or a 3279 Color Display Station Mdl 2A or S2A and can support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS Session can be active concurrently and the user can interact with either session alternately. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5162 8-bit expansion slot. A customer supplied attachment cable is required for host system attachment. Software such as the IBM PC 3270 Emulation Program, Entry Level or other communications software is required. For file transfer, a 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required. For attachment to the 4321 or 4331, specify code #9843 must be installed on the 4321 or 4331. See 4700 System Descriptions for 4700 attachment prerequisites. Other Usage: Also available on the IBM PC, the IBM PC XT, the IBM Personal Computer AT, the XT/370, the AT/370, the IBM RT Personal Computer, the 5531 Industrial Computer and the 4700 Personal Computer. See individual system descriptions for capabilities and prerequisites.

IBM Token-Ring Network PC Adapter II (#5063): This option provides an alternative for attaching the IBM Personal Computer XT Mdl 286 to the IBM Token-Ring Network. In addition to the function provided by the Token-Ring Network Adapter (#3391), this feature can be used to attach devices which require additional RAM for increasing message segment size and/or increasing the number of link stations supported by the adapter. For example, the IBM Token-Ring Network PC Adapter II in a server may improve performance when multiple workstations require simultaneous access to the server.

Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS), and an attachment cable (#5063) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. PTF UR 17210, an update to the Adapter Handler Program is required for proper 5162 operation. Available from IBM Support Centers and NDD Dealer Support Centers.

(Except LAD > PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD > The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD > Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
 Depth - 336mm (13.26 in.)
 Height - 107.95mm (4.25 in.)
 Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
 Relative Humidity: 8 to 80 percent
 Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <)

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512KB of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 5.25 inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128KB memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT
- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-L1A, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128KB or 512KB of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.
- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.
- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128KB or 512KB of memory, four or eight ports, and will be shipped with either 5.25 inch or 3.5 inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25 inch or 3.5 inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512KB Memory Expansion (#6242, P/N 00F5529): Replaces the 128KB of Co-Processor memory with 512KB of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512KB.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

Enhanced Memory Expansion Adapter (P/N 74X:635, #8635): This multifunction adapter provides up to 12Mb of memory, split memory addressing, a parallel printer port, and an asynchronous serial communications port. The adapter comes with Above Disc to convert extended memory to expanded memory for EMS applications.

Memory for the adapter is sold separately. Memory module kits can be added in increments of .5Mb, 1Mb, or 2Mb up to a maximum of 3Mb, 5Mb, 6Mb, or 12Mb per adapter. A maximum of five adapters (4 in an XT-286) may be installed, providing a maximum of 15Mb of additional memory. The split memory addressing feature allows the base memory to be filled up to the 640Kb limit with the remaining adapter memory automatically becoming part of the expansion memory area.

The asynchronous serial communications port is a 9-pin D-shell RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer, or other serial device. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel printer port provides a 25-pin connector to connect a parallel printer.

One 16-bit expansion slot is required for each adapter. Adapters are customer installable. A maximum of two serial and three parallel ports are supported by the 5162. One serial and one parallel port is included in the 5162. Adapters can be used to provide up to two serial and two parallel ports.

Machine requirements: The Enhanced Memory Expansion Adapter can be installed in all models of the XT-286. One 16-bit expansion slot is required for each adapter. The adapter is sold without memory. Therefore, memory must be purchased separately. The adapter can use the 512Kb Memory Module Kit (#3397) and the 1Mb Memory Module Kit (#3402) as well as the new 2Mb Memory Module Kit (#7833).

The adapter conforms to FCC Class B specifications.

Programming requirements: Use of Above Disc requires DOS 3.0 or higher.

2Mb Memory Module Kit (P/N 74X7833, #7833): Expands the memory capacity of the Memory Expansion Adapters (#3395), (#3400), and the Enhanced Memory Expansion Adapter (#8635) in increments of 2Mb up to a maximum of 12Mb per adapter. Each kit consists of two 1,024Kb memory modules which are inserted into memory module sockets on the adapter. A maximum of six kits can be added to each adapter. Kits are customer installable. Installation on Memory Expansion Adapters (#3395 and #3400) will require removing all currently installed 256Kb and 512Kb memory modules.

- Memory expansion up to 12Mb.
- Split memory addressing.
- Parallel printer port and asynchronous communications port.
- New easy to install 1Mb memory module.
- Supports IBM Operating System/2.
- Supports LIM EMS with Above Disc.
- One year limited warranty.

Personal Telephone Manager Adapter (#8982): Provides a telephone channel allowing the connection of the telephone to the Personal Computer for utilization of advanced telephone functions. The Personal Telephone Manager Program (P/N 6429190, feature #8989 of 5870-L1A) will provide advanced telephone applications. Technical Reference Manual (SX27-3657) provides adapter interface information for writing application software to enhance telephone applications. The "Personal Telephone Manager Hardware Maintenance and Service Assembly" may be obtained by ordering form SX27-3656. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot, analog telephone (pulse or tone) and cord with modular plug, standard analog USOC, RJ11C/W, RJ12C/W, RF13C/W wall connector, or IBM Token-Ring Network wall connector. Customer Setup: Yes. Limitation: This feature is US only.

ROLM Juniper II Business Communications Adapter (Mdl 46614): The ROLM Juniper II Business Communications Adapter adds digital business communication capabilities to the 5162 Mdl 286. Juniper II consists of a PC expansion card, digital telephone with built-in speaker phone, and ROLM Personal Communication Software. This combination provides data communications at speeds up to 19.2K via DEC VT100 and IBM 3270 Emulation, plus IBM Asynchronous file transfer. In addition, Juniper II allows simultaneous access to ROLM CBX telephony features (up to 4 lines) while con-

MACHINES

nected to a host over a single twisted pair wiring scheme. For information concerning ROLM products, contact your local ROLM dealer or call 800-321-ROLM.

Paper Inserts (300)	6341704
Keycap Removal Tools (6)	1351717
Keyboard Templates	6279940

Battery: The battery supporting the time and date clock is customer replaceable.

MODEL CONVERSIONS (NONE)

ACCESSORIES

Enhanced Personal Computer Keyboard Accessories

Description	Part Number
Clear Keycaps (60) with paper inserts	6341707
Blank Light Keycaps	1351710
Blank Dark Keycaps	1351728

Description	Part Number
Battery	72X8498

Accessories can be ordered through the National Distribution Division (NDD), Dayton, NJ, using the appropriate part numbers, or by calling IBM Direct on 1-800-426-2468.

SUPPLIES (NONE)

5170 PERSONAL COMPUTER AT

THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT

PURPOSE

The IBM Personal Computer AT is designed for professional applications, office environments, and increased personal productivity. It includes many advanced technology features previously not available in IBM Personal Computers: Increased performance, advanced microprocessor, high-capacity diskette drives, high-capacity fixed disk drives, large memory capacity, and advanced co-processor. The 5170 provides compatibility with existing hardware and software products for the IBM Personal Computer family.

MODELS

Model 068: (NO LONGER AVAILABLE)

System Unit/Keyboard, 256Kb Memory, high-capacity 1.2Mb Diskette Drive, ROM Based BASIC Language, clock/calendar with battery backup, keylock.

Model 099: (NO LONGER AVAILABLE)

System Unit/Keyboard, 512K Memory, high-capacity 1.2Mb Diskette Drive, 20Mb Fixed Disk Drive, Serial/Parallel ADAPTER, ROM based Basic Language, clock/calendar with battery backup, keylock.

Model 239: System Unit/Keyboard, 512Kb Memory, high-capacity 1.2Mb Diskette Drive, 30Mb Fixed Disk Drive, Serial/Parallel ADAPTER, ROM based Basic Language, Clock/Calendar with battery backup, keylock.

Model 319: Same as Model 239 except advanced high-performance Intel 80286 micro-processor with 8MHz clock as standard. See M5170 Models 319 and 339 description later in document.

Model 339: Same as Model 319 except 101 key Enhanced Personal Computer Keyboard is standard. See M5170 Models 319, 339, 919 and 939 description later in document.

Model 495: (NO LONGER AVAILABLE) System Unit and Series/1 Microprocessor with 256Kb Memory integrated with PC AT with 512K bytes of memory, 20Mb Fixed Disk Drive, Fixed Disk/Diskette Drive Adapter, 1Mb Diskette Drive, Six-Port Terminal/Host Attachment Card, and Serial/Parallel Adapter. See M5170-495 description later in this section.

Model 496: System Unit has a Series/1 Microprocessor with a 1M byte Memory integrated with a Personal Computer AT (Model 339) with a 512K byte memory, 30Mb Fixed Disk Drive, Fixed Disk/Diskette Drive Adapter, 1M byte High-Capacity Diskette Drive, Six-Port Terminal/Host Attachment Card, Personal Computer Enhanced Keyboard, See M5170-496 description later in this section.

Model 839: AT/Store Controller. This model of the Personal Computer AT is a pre-configured System Unit/Keyboard Model 239 with an IBM Store Loop Adapter plugged and tested prior to shipment (see Special Features section for descriptions).

Model 849: System unit/keyboard, Intel 80286 microprocessor at 8 MHz, 512Kb memory, high-capacity 1.2Mb diskette drive, fixed disk and diskette drive adapter, serial/parallel adapter, 30Mb fixed disk drive, ROM based BASIC language, keylock, clock/calendar with battery backup, Enhanced Personal Computer Keyboard, and Store Loop Adapter.

Model 899: (NO LONGER AVAILABLE)

AT/Store Controller. This model of the Personal Computer AT is a pre-configured System Unit/keyboard Model 099 with an IBM Store

Loop Adapter plugged and tested prior to shipment (see Special Features section for descriptions).

Prerequisites: The 5170 requires a video display adapter and device for display output. It is powered by a standard 115/230 volt, 50 Hz or 60 Hz power source (voltage can be switched by user). IBM Personal Computer DOS 3.0, IBM Personal Computer XENIX or IBM Personal Computer Interactive 1.1

The Series/1 System Unit, 5170 Model 495 requires a 5151 Monochrome Display Model 001 (or equivalent) and the Monochrome Display and Printer Adapter (#4900). Series/1 Input/Output Executive (5917-EM1).

If a Model 899, Model 839 and Model 849 (AT/Store Controller) is operating in store control mode, the 4680 Operating System Licensed Program and appropriate IBM or user written application programs are required.

Limitations: Other options, adapters, or devices not specifically listed as supported by the 5170 are not supported. Some of these non-supported items include:

- 5161 Expansion Unit Model 1, 2 or 3
- 5181 Compact Printer
- 64Kb Memory Module Kit (#1003) (P/N 1501003)
- 64/256Kb Memory Expansion Option (#1013) (P/N 1501013)
- Prototype Adapter (#1400) (P/N 1501400)
- Binary Synchronous Communications Adapter (#2075) (P/N 1502074)
- SDLC Communications Adapter (#2090) (P/N 1502090)
- Asynchronous Communications Adapter (#2074) (P/N 1502074)
- 10Mb Fixed Disk Drive (#2500) (P/N 1602500)
- 5-1/4 Inch Single-sided Diskette Drive (#3800) (P/N 1503800)
- 5-1/4 Inch Diskette Drive Adapter (#3780) (P/N 1503780)
- Printer Adapter (#5200) (P/N 1505200)
- Fixed Disk Adapter (#2501) (P/N 1602501)
- 5-1/4 Inch Dual-sided Diskette Drive (#3810) (P/N 1503810)
- XT/370 Option Kits (#3891 or #1509) (P/N 1602509)

HIGHLIGHTS

- Performs more than two times faster than current members of the IBM Personal Computer family.
- Based on high-performance Intel 80286 microprocessor, compatible with the IBM Personal Computer family.
- Includes 1.2Mb high-capacity diskette drives.
- Allows 20Mb and 30Mb fixed disk drives.
- Contains a standard combination fixed disk and diskette adapter.
- Provides 512Kb Memory capacity on the system board.
- Offers a combination Serial (Asynchronous)/Parallel Printer Adapter on the Models 099, 239, 599, 839 and 899.
- Allows workstation growth with eight I/O expansion slots.
- Includes an improved keyboard.
- Includes a clock/calendar with battery backup.
- Provides improved security capability with a standard keylock.

The following features are supplied as standard with the 5170:

- 84-key keyboard with a 10 foot coil cable on Models 068, 099, 239, 319, 599, 839 and 899.
- Enhanced Personal Computer Keyboard with a 10-foot coil cable on Model 339 and Model 849.

- Eight option (Feature) slots. Six support 16-bit or 8-bit option cards, two support 8-bit option cards only.
- All models use one 16-bit slot for the standard combination of Diskette Drive and Fixed Disk Adapter.
- The Models 099, 239, 599, 839, 849 and 899 use one 8-bit slot for the Serial/Parallel Adapter.
- Diskette program entitled: Exploring the IBM Personal Computer AT.

Compatibility: The following IBM Personal Computer hardware options are supported on the 5170:

- 4201 Proprinter Model 1
- 5182 Color Printer Model 1
- 5152 Graphics Printer Model 2
- Printer Cable (#5612) (P/N 1525612)
- Printer Stand (#5614) (P/N 1525614)
- 5151 Monochrome Display Model 1
- 5153 Color Display Model 1
- 5154 Enhanced Graphics Display Model 001
- 5175 Professional Display Model 001
- Personal Computer Cluster Adapter (#1206) (P/N 1501206)
- (NO LONGER AVAILABLE)
- Monochrome Display and Printer Adapter (#4900) (P/N 1504900)
- Color/Graphics Monitor Adapter (#4910) (P/N 1504910)
- Communications Adapter Cable (#2067) (P/N 1502067)
- Game Control Adapter (#1300) (P/N 1501300)
- 3278/79 Emulation Adapter (#2507) (P/N 1602507) with AT/370 Option Kit (#6115) (P/N 6236115)
- Enhanced Graphics Adapter (#1200) (P/N 1501200)
- Graphics Memory Expansion Card (#1201) (P/N 1501201)
- Graphics Memory Module (#1203) (P/N 1501203)
- Professional Graphics Controller (#1501) (P/N 6451501)

The 5520 Administrative System can be used as a clustered support system for up to 35 5170s via the 5520/Personal Computer Attachment Program Version 3. This provides the users with a multi-function display station that may be used as a stand-alone 5170, as well as an emulated 5253 Display Station. In 5253 emulation mode, the 5170 can also emulate a 3278 Display Station Model 2, which includes file transfer support with the S/370 host.

The 5170, in 5253 emulation mode, has access to 5520 Administrative System functions such as text, administrative files processing, local and peer-to-peer distribution, DISOSS library and distribution services, storage, quality printing, and document interchange.

Description: The 5170 system unit/keyboard includes the following standard features:

- Advanced high-performance Intel 80286 microprocessor
- ROM based automatic power on self test of system components
- ROM based BASIC language interpreter
- 8086 compatible real address mode
- Protected virtual address mode
- 256Kb of memory (Model 068)
- 512Kb of memory (Models 099, 239, 319, 339, 495, 839, 849, and 899)
- 1.2Mb high capacity-diskette drive
- Diskette interface
- 20Mb fixed disk drive (Models 099 and 899)
- 30Mb fixed disk drive (Models 239, 319, 339, 839 and 849)
- Fixed disk interface
- Fixed disk-in-use indicator light (red)
- Serial/parallel interface (Models 099, 239, 319, 339, 839, 849, and 899)
- System clock/calendar/system configuration storage with battery back-up
- Sound system
- Keylock
- Bidirectional keyboard interface
- Enhanced keyboard
- Switchable worldwide power supply
- Power-on indicator light (green)

- Eight I/O expansion slots
- Socket for 80287 math co-processor
- 24-bit addressing
- 16-bit data path
- 7-channel direct memory access (DMA)
- 16-level interrupt
- Three programmable timers
- In the Model 899 or 839:
 - Model 099 or 239 standard features
 - Store Loop Adapter
 - PC AT/Store Controller Ship Group
- In the Model 849:
 - Model 339 standard features
 - Store Loop Adapter
 - PC AT/Store Controller Ship Group

The following optional features are available for the 5170 System Unit only:

- 30Mb Fixed Disk Drive
- Multiprotocol Communications Adapter (#8001)
- Second Store Loop Adapter (#8002)
- Store Loop Cable (#8003)

The following new options are available for the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM Personal Computer AT:

Display stand (#0216) (P/N 6450216)
 PC Network Adapter (#0213) (P/N 6450213)
 PC Network Cabling Components (eight separately priced components)
 Binary Synchronous Communications Adapter (#1204) (P/N 1501204)
 SDLC Communications Adapter (#1205) (P/N 1501205)
 5178 PC Network Translator Unit

Physical Specifications: 5170 System Unit:

- 6.0 MHz clock speed on Models 068, 099, 239, 495, 839 and 899
- 8.0 MHz clock speed on Models 319, 339 and 849
- 24-bit addressing
- 16-bit data path
- 64Kb ROM
 - Access time - 150ns
 - Cycle time - 355ns
- 192 watt power supply
- Variable speed temperature controlled fan
- Dimensions:
 - Length - 540mm (21.25 in.)
 - Depth - 439mm (17.28 in.)
 - Height - 162mm (6.38 in.)
 - Weight - 16.80Kg (37.0 lbs.) (Model 068), 19.01Kg (42.0 lbs.) (Model 099)
- Electrical:
 - 90-137V, 50-60 Hz
 - 180-259V, 50-60 Hz
- Air Temperature:
 - System on, 15.6 - 32.2 degrees C (60 - 90 degrees F)
 - System off, 10 - 43 degrees C (50 - 110 degrees F)
- Relative Humidity:
 - System on, 8 - 80 percent
 - System off, 20 - 80 percent
- BTU Output: 1,229 BTU/Hr
- Noise Level: Variable by speed of fan, class code 3 for Models 068, 099, 899, 239, 899 and 839 Note: Class code 3 suitable for office environment

DESCRIPTION

Based on a high-performance 16/24-bit Intel 80286 microprocessor, all models of the 5170 are equipped with a high-capacity (1.2Mb) diskette drive, enhanced keyboard, ROM based BASIC language, clock/calendar with battery backup, and keylock. Standard memory on Model 068 is 256Kb and on a Model 099, 239, 319, 339, 839, 849 and 899 is 512Kb. In addition, Model 099, and 899 are equipped with a 20Mb fixed disk drive and a serial (asynchronous)/ parallel printer adapter and the Model 239, 319, 339, 839 and 849 are equipped with

a 30Mb fixed disk drive and a serial (asynchronous)/parallel printer adapter. Each system can be further expanded through customer setup options. Model 068 memory may be expanded to 512Kb by addition of pluggable memory modules on the system board. The Model 099 may be further expanded to 640Kb with the 128Kb memory option or up to 3Mb memory options.

Model 899 is a Model 099 with the addition of a Store Loop Adapter as standard and requires either the 128Kb Memory Expansion Option (#0209) or the 512Kb Memory Expansion Option (#0203) for operation with the IBM 4680 Operating System Licensed Program. Standard PC AT options may be added depending upon option slot availability. Model 839 is a Model 239 with the addition of a Store Loop Adapter as standard and requires either the 128Kb Memory Expansion Option (#0209) or the 512Kb Memory Expansion Option (#0203) for operation with the IBM 4680 Operating System Licensed Program. Standard PC AT options may be added depending upon option slot availability. Model 849 is a Model 339 with the addition of a Store Loop Adapter as standard and requires either the 128/640Kb Memory Expansion Option (#3338) or the 512Kb/2Mb Memory Expansion Option (#3343) for operation with the IBM 4680 Operating System Licensed Program. Standard PC AT options may be added depending upon option slot availability. Memory expansion is achieved via the 512Kb Memory Module Kit (#3339) which may be added to features #3338 and #3343.

Additional direct access storage is available with a 20Mb or a 30Mb Fixed Disk Drive, a second 1.2Mb High-Capacity Diskette Drive, and a Dual-sided (320/360Kb) Diskette Drive. A maximum of two diskette drives and one fixed disk drive, or one diskette drive and two fixed disk drives can be attached to the system unit. These combinations result in direct access storage capacity of up to 41.2Mb.

DOS 3.0 supports the 20Mb Fixed Disk Drive and 1.2Mb High-Capacity Diskette Drive in the 5170 system. With DOS 3.0, the 1.2Mb diskette drive will also read single- and dual-sided diskettes formatted at 160/180Kb and 320/360Kb capacity, respectively. The dual-sided diskette drive (320/360Kb) is available for downward diskette portability with other IBM Systems Personal Computer family members.

To fully utilize the 1.2Mb High-Capacity Diskette Drive, new diskette media is required. The media is available from the IBM Systems Supplies catalog with the following description:

IBM 5.25 Diskette 2HC, double-sided, high-capacity, 96 tracks per inch, soft-sectored, P/N 6109660.

To order diskettes, contact IBM Direct, toll-free via 1-800-465-1234.

The IBM Personal Computer AT is also supported by three other operating systems. Personal Computer Interactive Executive (PC/IX) Version 1.1 will support the IBM Personal Computer AT in compatibility, real address mode. PC/IX will be available in the fourth quarter of 1984. The IBM Personal Computer XENIX* will support the IBM personal Computer AT in the 80286 protected address mode. IBM VM/PC 1.1 and DOS 3.0 or 3.1 for support of the AT/370 option.

* XENIX is a trademark of Microsoft Corporation.

The PC AT Model 839, 849 or 899 when being used as a store controller is supported by the IBM 4680 Operating System Licensed Program (5669-033). Other licensed programs available from IBM for store operations support are: IBM 4680 Basic Language (5669-034) (used to modify via user exits, source code changes), and the IBM 4680 General Sales Application (5669-031) (general merchandise sales environment). The Model 839, 849 and 899 when not being used as a Store Controller, can operate using PC DOS 3.1.

The 5170 contains eight option (feature) slots that support feature cards for additional devices, features, or memory. Six of the slots support either the advanced 16-bit or 8-bit option cards. Two support 8-bit option cards only. However, all models use one 16-bit slot for the standard combination fixed disk and diskette drive adapter. The Model 099, 599 and 239 use one 8-bit slot for the Serial/Parallel Adapter. The Models 839, 849 and 899 use, in addition to the combination fixed disk and diskette adapter and Serial/Parallel Adapter, one 8-bit or 16-bit slot for the Store Loop Adapter. The result is

seven available expansion slots on Model 068, six on Model 099, five on the Models 839, 849 and 899.

All models include a world-wide power supply and a temperature-controlled variable speed cooling fan that significantly reduces acoustical noise in most user environments. All models also include a security keylock, which, when locked by the user, prevents removal of the 5170 cover, initialization of the system, and entry of command/data from the keyboard.

The keyboard is attached to the 5170 via a 10-foot coiled cable, permitting a variety of workspace configurations. The enhanced 84-key keyboard with an adjustable typing angle, offers commonly used data and word processing functions along with separate typewriter and numeric keypads. Key location enhancements and mode indicators (Cap Lock, Numeric Lock, Scroll Lock) improve keyboard usability. Special symbols may be accessed with a combination of keys. Depending on the application program, from 10 to 40 special function keys may be supported.

Exploring the IBM Personal Computer AT, a program on a diskette, is supplied with the 5170. It will familiarize a new computer user with the 5170. The program takes 1-1/2 to 2-1/2 hours to complete. There are two versions of the program, monochrome and color. The program is self-loading from the diskette. It contains tutorial information on the keyboard, printer, and disk storage, as well as DOS and text editing. It requires a 5170 with a minimum of one diskette drive, 256Kb of storage, and one display adapter (either monochrome or color).

PUBLICATIONS

Each system will be shipped with a minimum of three manuals:

- "IBM Personal Computer AT Installation and Setup Manual" (#2491) (P/N 1502491)
- "IBM Personal Computer AT Guide to Operations" (#2241) (P/N 1502241)
- "IBM Personal Computer Basic Reference Manual Version 3.0" (#1132) (P/N 6361132)

The Models 899, 839 and 849, in addition to the above PC AT manuals, will be shipped with the following manuals contained in a red and white box labeled "OPEN FIRST Set-Up Instructions":

- "IBM 4680 Store System: Messages, Symptoms, and Problem Resolution Guide" (SC30-3358)
- "IBM 4680 Store System: Terminal Operations Guide" (SA27-3704)
- "IBM 4680 Store System: Setup and Verification" (SA27-3704)
- "IBM Guide to Operations - Personal Computer AT Store Loop Adapter" (SA27-3694)

The following manual is shipped with the Multiprotocol Communications Adapter:

- "IBM Guide to Operations - Personal Computer AT Multiprotocol Communications Adapter" (SA27-3717)
- "IBM Personal Computer AT Technical Reference Manual for Model 239" (P/N 6280070)

The following are available for purchase:

- "IBM Personal Computer AT Technical Reference Manual" (#2243) (P/N 1502243)
- "IBM Personal Computer AT Hardware Maintenance and Service Manual" (#2242) (P/N 1502242)
- "IBM Personal Computer AT/370 Technical Reference" (#2527) (P/N 6822527)
- "IBM Personal Computer AT/370 Hardware Maintenance and Service Manual" (#2529) (P/N 6322529)
- "IBM Personal Computer AT/370 Hardware Maintenance and Service Manual for a 3278/79 Emulation Adapter on the AT/370" (#2980) (P/N 6322980)
- "IBM Personal Computer 3278/79 Emulation Adapter Technical Reference Manual Addendum" (#2336) (P/N 6322336)
- "IBM Personal Computer 3278/79 Emulation Adapter Hardware Maintenance and Service Manual" (#6585)

- "IBM Hardware Maintenance and Service - Personal Computer AT Store Loop Adapter" (SY27-0296)
- "IBM Hardware Maintenance and Service - Personal Computer AT Multiprotocol Communications Adapter" (SY27-0298)
- "IBM Personal Computer AT Technical Reference Manual - Multiprotocol Communications Adapter" (SY27-0299)

Note: The IBM Personal Computer AT/370 Manuals supplement the IBM Personal Computer Manuals of the same name.

Technical Assistance: The IBM Personal Computing Assistance Center (PCAC) will provide assistance to eligible IBM customers for the period of their qualifying contract.

SPECIFY (NONE)

SPECIAL FEATURES

256Kb Memory Module Kit (P/N 6450202): This option increases the 5170 Model 068 memory from 256Kb to 512Kb. The kit consists of 18 modules that are plugged into existing sockets on the system board. A maximum of one kit may be installed on Model 068 only. It is required on the Model 068 for installation of #0209 and #0203.

512Kb Memory Expansion Option (P/N 6450203): (NO LONGER AVAILABLE)

This option adds memory above 1Mb, in 512Kb increments. Up to five options may be plugged into the I/O expansion slots of the system unit to provide a total of three megabytes of primary storage. Performance characteristics are the same as other 5170 user memory. The system unit must have at least 512Kb installed. This option requires one 16-bit expansion slot.

Note: This option may not be used for address storage from 512Kb to 640Kb. The memory range from 640Kb to 1Mb is reserved for system functions.

20Mb Fixed Disk Drive (P/N 6450205): (NO LONGER AVAILABLE)

Two optional fixed disk drives may be installed on Model 068 or one, as a second fixed disk drive, on Models 099, 239, 839, 849 and 899 providing a total of 40Mb or 50Mb of fixed disk storage capacity. Space and power are provided in the system unit for this drive(s). All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. Increased performance of 40 ms average access time is possible from the quasi-closed loop servo positioning system utilized in the drive. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit.

Characteristics:

- 20Mb of storage
- 512 bytes per sector
- 17 sectors per track
- 615 tracks per surface (cylinders)
- 40 ms average access time
- Four surfaces
- 3573 RPM
- 5M bit per second transfer rate
- Dimensions:
 - Height - 82.55mm (3.25 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 2.9Kg (6.4 lbs.)

High-Capacity Diskette Drive (P/N 6450206): This is half-high, 5-1/4 inch, dual-sided drive with 1.2Mb storage capacity. Space and power have been provided in the system unit for up to two drives. The drive is fully self-contained and consists of a spindle drive system, a read positioning system and a read/write/erase system.

One of these drives is standard in both models. An optional second drive (P/N 6450206) may be installed in the system unit directly under the first if the space is not occupied by another disk or diskette drive. Both drives use the standard fixed disk and diskette drive adapter in the system unit. The drive uses the new 96-TPI, high density media. In addition, it will read or write 48-TPI, single- or dual-sided media written for the IBM PCjr, IBM Personal Computer, IBM Personal Computer XT, and IBM Portable Personal Computer, giving a high level of compatibility with existing applications. However, once the 48-TPI media has been written in this drive, it may only be readable on a high-capacity diskette drive.

Characteristics:

- 1.2Mb storage
- 512 bytes per sector
- 15 sectors per track
- 96 tracks per inch
- Two sides
- 80 tracks per side
- 360 RPM
- Supports 300 and 500K bps data transfer rate
- 94 ms average access time in 96-TPI mode
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 1.6Kg (3.5 lbs.)

Dual-sided Diskette Drive (P/N 6450207): This diskette drive permits the exchange of 320/360Kb diskette media between the Personal Computer AT, to the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM PCjr. It is a half-high, 5-1/4-inch, dual-sided drive with a 320/360Kb storage capacity. Space and power for one drive have been provided in the system unit. The drive is fully self-contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system.

This drive is available for all 5170 models. It is installed in the system unit directly under the standard high capacity diskette drive if the space is not occupied by another fixed disk or diskette drive. This drive uses the standard fixed disk and diskette drive adapter in the system unit.

Characteristics:

- 320/360Kb of storage
- 512 bytes per sector
- 8/9 sectors per track
- Two sides
- 91 ms average access time
- 40 tracks per surface
- 48 tracks per inch
- 300 RPM
- Transfer rate of 250K bps
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 1.6Kg (3.5 lbs.)

128Kb Memory Expansion Option (P/N 6450209): This option expands the memory from 512Kb to 640Kb. Performance characteristics are the same as other 5170 user memory. Only one 128Kb Memory Expansion Option may be installed on a 512Kb system unit and it requires a 16-bit expansion slot.

Note: This 128Kb Memory Expansion Option is not necessary and must not be installed in an AT/370 or in a 5170 Model 068 or 099 with an AT/370 Option Kit(P/N 6236115).

30Mb Fixed Disk Drive Option for Model 239 (#0210)(P/N 6450210): One 30Mb fixed disk option may be installed as a second fixed disk drive. This provides a maximum of 60Mb of fixed disk storage capacity. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit. Space and power are provided in the system unit for this drive(s). All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit.

A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. This option is available only for the IBM Personal Computer Model 239 and Model 839.

Math Co-Processor (P/N 6450211): This option is a high-performance numeric 80287 processor extension with floating point, extended integer, and BCD data types, compatible with the Intel 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Only one 80287 can be installed in a system unit.

PC Network Adapter (P/N 6450213): This option allows the 5170 to be connected to form an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at 2 million bits per second. Each PC on the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor, and Intel 82586 network controller, a fixed-frequency modem, and network microcode that off loads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75 MHz transmit frequency and a 219 MHz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The Network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network Adapter is provided with a 9-foot cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1,000 feet from the 5178 Unit. Limitations: Each user who is to share an application program on a PC Network must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit; DOS Version 3.1 or later if the PC Network Program is to be used. Maximum: One. Customer Setup: Yes.

Serial/Parallel Adapter (P/N 6450215): This option provides a serial port and a parallel port. It occupies only one expansion slot of either type. The serial portion is fully programmable and supports asynchronous communications from 50 to 9600 bps. The back of the adapter has a 9-pin D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (P/N 6450217) or 10-inch Serial Adapter Connector (#0242) (P/N 6450242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. One or two Serial/Parallel Adapters may be installed in all models. Note: This adapter does not support current loop operation. The 5218 Printer is not supported.

Display Stand (P/N 6450216): The display stand is available for the 5151 Monochrome Display and 5153 Color Display. It can be placed under the display to allow the customer to tilt and/or swivel the display for comfortable viewing.

Floor Standing Enclosure (P/N 6450218): This optional enclosure is available to customers who desire to remove their system unit from the work surface. With the system unit mounted vertically in the floor standing enclosure, only the essential parts of the system such as the display and keyboard need to be on the work surface. The unit may be positioned left or right of the workspace or under the workspace.

Prototype Adapter (P/N 6450220): This adapter is a 4.8 in. high by 13.12 in. long and plugs into any system unit expansion slot except 1 or 7. Two-card edge tabs, one 2 by 31 positions and one 2 by 18 positions, provide all system control signals and voltages. No

components are shipped with this card. The adapter contains a voltage bus (+5V DC) and a ground bus (0V DC). Each bus borders the adapter with the ground bus on the component side and the voltage bus on the pin side. A system interface (wiring only) is also provided with a space for a jumper to specify whether the device has an 8- or 16-bit data bus. This adapter also accommodates a D-shell connector from 9 to 37 positions. A recommended system interface logic diagram is available along with a list of recommended components to be used to interface custom logic to the 5170. Up to five Prototype Adapters can be installed in a system unit. Each requires a 16-bit expansion slot.

PC Network Base Expander (P/N 6450230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to eight Short Distance Kits, Medium Distance Kits, and/or Long Distance Kits in any combination to further extend the distance between the PC with the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

PC Network Short Distance Kit (P/N 6450231): Provides one-foot of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Medium Distance Kit (P/N 6450233): Provides 400-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when issued in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Long Distance Kit (P/N 6450233): Provides 800-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 25-Foot Cabling Segment (P/N 6450234): Provides 25-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 50-Foot Cabling Segment (P/N 6450235): Provides 50-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installations: Yes. Customer Setup: Yes.

PC Network 100-Foot Cabling Segment (P/N 6450236): Provides 100-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network 200-Foot Cabling Segment (P/N 6450237): Provides 200-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450237) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Transformer Unit (#0238)(P/N 6450238): This unit is packaged separately from the 5178 PC Network Translator Unit, however, it is required for the operation of the 5178-F Network

Translator Unit and is a 120-volt transformer which plugs into a standard grounded outlet. Field Installation: Yes. Customer Setup: Yes.

30Mb Fixed Disk Drive Upgrade Kit for Models 068, 099 and 599 (#0468)(P/N 1602513): This Upgrade Kit which supports IBM Personal Computers AT Models 068, 099, and 599 includes all the features of the 30Mb option for the IBM Personal Computer AT Model 239. The Upgrade Kit also contains a new Basic Input/Output Subsystem (BIOS) essential to the operation of the IBM Personal Computer AT. To support the 30Mb Fixed Disk Drive, a new diagnostics diskettes, and an updated to the "Guide to Operations Manual" are shipped with this kit. It is recommended that this upgrade kit be installed by IBM authorized service personnel. The kit includes instructions to the end user to this effect. Installation is at no additional charge above that of the upgrade kit.

Enhanced Graphics Adapter (#1200)(P/N 1501200): Provides a 9-pin connector on the end of the card for a display that presents a direct-drive RGB (Red, Green, Blue) signal. This Adapter contains 64Kb of graphics memory. It supports four colors at a resolution of 640 pels x 350 pels, an 8 x 14 character box for color text, and 256-characters in text mode. A character generator can be loaded from RAM to allow any set of 256-characters to be used. One light pen can be attached to this adapter in addition to one display via the P-2 connector (6-pin Berg strip on the side of the card). This adapter provides support for one of the following: 5154 Enhanced Color Display, 5151 Monochrome Display, 5153 Color Display or another direct-drive display. Two modes are supported by the Enhanced Graphics Adapter - the enhanced mode which is required for the 5154 Display if its 640 x 350 resolution and selection of up to 64 colors are to be used and - the enhanced display emulation mode which supports the 5151, 5153, and 5154 displays and all the modes provided by the Monochrome Display and Printer Adapter (plus the addition of an all-points-addressable graphics mode for the 5151 Display that is not provided by the Monochrome Display and Printer Adapter) and the Color/Graphics Adapter (plus certain graphics support for the 5153 Display that is not provided by the Color/Graphics Adapter (16 colors for 40 columns in 320 x 200 resolution and 16 colors for 80 columns in 640 x 200 resolution). Limitations: Composite video support for attaching analog monitors or TV sets is not provided. A light pen is not supported when the Enhanced Graphics Adapter is used with the 5151 Display. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Graphics Memory Expansion Card (#1201)(P/N 1501201): Provides 64Kb of graphics memory for a total of 128Kb on the Enhanced Graphics Adapter to support up to 16 colors at the 640 x 350 resolution and up to 512 text characters. With the Graphics Memory Module Kit (#1203), the Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card will support up to 1,024-characters (up to eight 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (#1200) plus any prerequisites of that feature. Maximum: One. Customer Setup: Yes.

Graphics Memory Module Kit (#1203)(P/N 1501203): Provides 128Kb of graphics memory for a total of 256Kb on the Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card (#1201) to support up to 1,024-characters (up to eight 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card (#1201) plus any prerequisites of that feature. Maximum: One. Customer Setup: Yes.

Binary Synchronous Communications Adapter (#1204) (P/N 1501204): The BSC Adapter provides an EIA RS-232-C interface. It is compatible with the IBM Personal Computer, the Portable Personal Computer, and the Personal Computer XT. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter or a Multiprotocol Communications Adapter is installed. If two Multiprotocol Communications Adapters are installed, no BSC Adapters may be installed.

SDLC Communications Adapter (#1205) (P/N 6501205): The SDLC Communications Adapter provides an EIA RS-232-C interface. It is compatible with the IBM Personal Computer, the Portable Personal Computer, and the Personal Computer XT. Only one SDLC Adapter may be installed. One Multiprotocol Communications Adapter can be installed with one SDLC Adapter. If two Multiprotocol Communications Adapters are installed no SDLC Adapters can be installed.

Cluster Adapter (#1206) (P/N 1501206): (NO LONGER AVAILABLE)

Permits the 5170 to be included in a Cluster of interconnected personal computers which can include the IBM PCjr, the 5150, 5155, 5160, 5170, XT/370, AT/370 and 5531 Industrial PC. The clustered IBM Personal Computer configuration utilizes baseband signaling and carrier sense multiple access with collision avoidance (CSMA/CA) access protocol. The topology of the interconnection is a bus environment using 75-ohm coaxial cable. The data transmission is 375Kb per second. The Cluster Program is provided to support up to 64 PCs in a clustered configuration. This program permits small work groups in schools and businesses to exchange messages and data files and optionally to share a fixed disk that contains programs. Messages and files can be transferred between any two PCs in the cluster and a message can be broadcast from one PC to all other PCs in the cluster. When a fixed disk is to be shared, the PC in the Cluster with the fixed disk must be designated as a disk server. When a disk server PC is defined, a download option is made available which will permit downloading DOS, the cluster program, and an application program from the disk server PC to a remote PC in the cluster when the remote computer is powered on. Limitations: Each user who is to share an application program on a cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit; DOS Version 3.0 or later. If the 5170 is designated as the disk server computer, it must have 256Kb of memory and one fixed disk. The cluster program requires a maximum of 29Kb of resident memory except when the PC is utilized as a disk server when a maximum of 136Kb of memory is required. DOS requirements must be added to the cluster program size to determine the memory available for application programs. Maximum: One. Customer Setup: Yes.

Cluster Cable Kit (#1207) (P/N 1501207): Is used to interconnect the first two PCs in an IBM PC cluster and attaches to the Cluster Adapter (#1206). Each PC in the cluster after the first two also requires a cluster cable kit. The Cluster Cable Kit provides a main coaxial cable bus of approximately 32 feet, two cable drops approximately 9 feet each for attachment to the main coaxial cable and to the BNC connectors of a cluster adapter, BNC T-connectors for attaching the cable drops to the main coaxial cable and two terminating plugs. Maximum: One. Customer Setup: Yes.

256Kb Memory Expansion Option (#1209) (P/N 1501298): Provides an additional 256Kb of parity-checked random access memory on a 5-inch card. Access time of the memory on the 256Kb Memory Expansion Option card is 290 ns and the cycle time is 840 ns. This card can be installed in any full-feature slot. Field Installation: Yes. Prerequisites: The 5170 Model 68 must have 256Kb installed on the system board as a prerequisite. Customer Setup: Yes.

(Except LAD > IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the

Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <

(Except LAD> IBM PC Network Adapter II supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL). <
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment

- Machine requirements

IBM PC Network Adapter II requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

(Except LAD> IBM PC Network Baseband Adapter (#1221, P/N 1501): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30.

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to eight workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to ten daisy chains with eight workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <

(Except LAD> IBM PC Network Baseband Adapter supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.

- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than eight nodes. <
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment

- Machine Requirements

IBM PC Network Baseband Adapter requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

Professional Graphics Controller (#1501) (P/N 6451501): (NO LONGER AVAILABLE)

Is required to attached the 5175 Professional Graphics Display to a 5170. The 5175 Display together with the Professional Graphics Controller offers more colors and a higher resolution than the 5154 Enhanced Color Display with the Enhanced Graphics Adapter and provides high-quality color graphics capabilities for a wide range of specialized applications. The Professional Graphics Controller provides two modes: expanded graphics for full support of the 5175 Professional Display and Color/Graphics Monitor Adapter emulation. It offers 640 x 480 resolution for expanded graphics mode and 640 x 400 for emulation mode as well as 256 colors from a palette of 4,096 for expanded graphics mode. There is built into the Controller two-dimensional and three-dimensional capability for drawing, rotating, translating and scaling. An Intel 8 MHz 8088 microprocessor is provided for high-performance graphics operations and the Controller provides 320Kb of display storage. Additionally, the Controller has 64Kb of graphics microcode that reduces the need to load software routines to support key graphics activities. Limitations: When the Professional Graphics Controller is installed together with the Color/Graphics Monitor Adapter, the Professional Graphics Controller must operate in expanded graphics mode. Prerequisites: Two adjacent full-feature slots in the 5170. Maximum: One. Customer Setup: Yes.

Data Acquisition and Control Adapter (#1502) (P/N 6451502): Provides analog input/output channels and digital input/output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis, and quality control testing in laboratory, pilot plant, or full-scale production lines. The adapter provides four analog input channels with throughput to memory at 15,000 conversions per second, two analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of option for analog input/output channels and programmed I/O mode for digital input/output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Limitations: All adapters must be installed as a group in the system unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit for each adapter desired. Maximum: Four. Customer Setup: Yes.

General Purchase Interface Bus Adapter (#1503) (P/N 6451503): Provides an interface between an IBM Personal Computer and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters, and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300K bps. and programmed I/O data rate of up to

10K bps. It allows the user to select interrupt level and memory access channels. Limitations: All adapters must be installed as a group in either the system unit or the expansion unit. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit for each adapter desired. Maximum: Four. Customer Setup: Yes.

Data Acquisition and Control Adapter Distribution Panel (#1504) (P/N 6451504): Provides easy access to the I/O signals, voltages, and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34 inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with four barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change, or remove the instruments and/or control points being used. Field Installation: Yes. Prerequisites: An adapter Acquisition and Control Adapter for each panel desired. Maximum: Four. Customer Setup: Yes.

System/36 LAN Attachment Adapter (#3098): This PC feature is used with the System/36 LAN Attachment feature (#6500 on the 5360 System, #3315 on the 5362 System) and the IBM Token-Ring Network PC Adapter II (PC Feature) to provide System/36 with connectivity to the IBM Token-Ring Network.

This PC feature is automatically shipped with the System/36 LAN Attachment features (Features #6500 and #3315 ordered against the System/36). It should only be ordered separately as a PC feature when a spare System/36 LAN Attachment Adapter card is desired. In this case, order PC Feature #3098 under 5150-ZZZ order vehicle. Limitations: This card must be installed in the PC system unit. Maximum: One. Customer Installation: Yes. Prerequisites: None.

5170 Personal Computer AT S/370 Channel Emulator (#3200): The S/370 Channel Emulator is an adapter card for the IBM PC AT system which emulates the operation of an IBM System/370 channel. The card may be used with appropriate application software to channel attach certain S/370 devices to the PC AT. Prerequisites: None. Customer Setup: Customer is responsible for Installation and Setup.

Highlights:

- Single card for insertion in an IBM PC AT system unit
- 32K of on-card high speed memory
- Hardware support for Initial Selection and Data Transfer 370 channel sequences
- Read/write record size of up to 32K bytes
- Interlocked and data streaming interfaces may be emulated
- Byte, block or selector channel protocol may be emulated
- Support warranted for connection to the following 370 devices:
 - IBM 3820 Page Printer

Description: This adapter, when coupled with appropriate software, may be used to channel attach certain S/370 peripherals to the IBM PC AT.

The feature consists of a piggyback card which occupies a single slot and provides a D-shell connector to an interface cable. The interface cable is fitted with 370 BUS and TAG serpentine channel connectors for connection to the 370 peripheral.

The diagnostics may be used to check the operation of the card. The diagnostics require DOS V2.1 or later.

With appropriate software, a S/370 byte, block or selector channel may be emulated. Both the DC interlocked and data streaming protocols are supported.

Under software control, hardware assistance is available for the Initial Selection and Data Transfer channel sequences. An on-card buffer of 32K is used for the hardware data transfer sequence.

Publications: S/370 Channel Emulator Technical Library. This manual consists of:

- Guide to Operations
- Hardware Maintenance Guide
- Technical Reference
- Diagnostic diskette

Specify: The following components are included as part of feature #3200 or can be ordered separately.

- Card Assembly (P/N 70X5061)
- Cable (10 ft.) (P/N 70X4865)
- S/370 Channel Emulator Technical Library (P/N 6476158)

512Kb Memory Module Kit (P/N 6450339 - #3339): This feature provides an additional 512Kb memory on either the 128/640Kb or the 512Kb/2Mb Memory Expansion Options.

512Kb/2Mb Memory Expansion Option (P/N 6450343 - #3343): This feature comes with 512Kb of memory on the card. With additional 512Kb Memory Module Kits (P/N 6450339 - #3339), this card can be expanded up to 2Mb of system unit memory (the base card plus Memory Module Kits).

A maximum of five 512Kb/2Mb Memory Expansion Options can be installed in the system unit. A total of 10.5Mb of user memory is possible, with 512Kb of planar memory plus 10Mb of memory options (five cards times 2Mb/card).

IBM Token-Ring Network PC Adapter Cable (#3390)(P/N 6339088): The 2.4m (8 ft) cable is used to attached the IBM Personal Computer with a network adapter to the IBM Cabling System or directly to an access unit.

IBM Token-Ring Network PC Adapter (#3391)(P/N 6339100): Allows the IBM PC to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS) and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitations: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

Memory Expansion Adapter (P/N 55X3560 - #3395): A versatile multifunction adapter providing up to 3Mb of memory, split memory addressing, a parallel printer port and an asynchronous serial communications port. The adapter is provided with 512Kb of memory installed. Memory Module Kits can be added in increments of 512Kb up to maximum of 3Mb per adapter. A maximum of five adapters may be installed providing up to 15Mb of additional memory. Split memory addressing allows the base memory to be filled up to the 640Kb limit. Additional memory automatically becomes part of the expansion memory area. The asynchronous serial communications port is an RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. The parallel printer port provides a 25-pin connector to attach a parallel printer. Limitations: The 5170 can support a maximum of two serial ports and two parallel ports. Maximum: Five adapters. Field Installation: Yes. Prerequisite: One 16 bit expansion slot per adapter. Customer Setup: Yes.

Memory Module Kit (P/N 55X3547 - #3397): Expands the memory capacity of the Memory Expansion Adapter (#3395) in increments of 512Kb up to a maximum of 3Mb per adapter. (512Kb is provided with the Adapter.) Each kit consists of two memory modules (256K each) which must be inserted into memory module sockets on the adapter card. A fully populated Memory Expansion Adapter would consist of five Memory Module Kits and provide 3Mb of memory. Limitations: Five per adapter card. Field Installation: Yes. Prerequisite: Memory Expansion Adapter (#3395). Customer Setup: Yes.

Memory Expansion Adapter (P/N 55X3679, #3679): A versatile multifunction adapter providing up to 6Mb of memory, split memory addressing, a parallel printer port and an asynchronous serial communications port. The adapter is provided with 1Mb of memory installed. Memory Module Kits can be added in increments of 1Mb up to a maximum of 6Mb per adapter. Three adapters may be installed providing a maximum of 16Mb of additional memory. Split memory addressing allows the base memory to be filled up to the 640Kb limit. Additional memory automatically becomes part of the expansion memory area. The asynchronous serial communications port is an RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. The parallel printer port provides a 25-pin connector to attach a parallel printer. Limitations: The 5170 and 5162 can support a maximum of two serial ports and two parallel ports. Maximum: Three adapters and 16Mb of memory. Field Installation: Yes. Prerequisites: One 16-bit expansion slot per adapter. Customer Setup: Yes.

Memory Module Kit (P/N 55X3681): Expands the memory capacity of the Memory Expansion Adapter (#3395 or #3400 (P/N 55X3679)) in increments of 1Mb up to a maximum of 6Mb per adapter (1Mb is provided with the adapter.) Each kit consists of two memory modules (512Kb each) which must be inserted into memory module sockets on the adapter card. A fully populated Memory Expansion Adapter would consist of five Memory Module Kits and provide 6Mb of memory. Limitations: The 1Mb Memory Module Kit (#3402, P/N 55X3681) can be used only with IBM Memory Expansion Adapters (#3395 and #3400 (P/N 55X3679)). This 1Mb Memory Module Kit (#3402) can only be combined with the 512Kb Memory Module Kit (#3397) in a specific configuration.

3278/79 Emulation Adapter (#5050): Expands the capabilities of the 5170 by providing coaxial cable attachment to the 3274 and 3276 Control Unit, the 4321, 4331 or 4361 Processor Display/Printer Adapter, the 4361 Workstation Adapter or the 4701 Finance Communication Controller or the 9370 Workstation Adapter. When used with the IBM PC 3270 Emulation Program, Entry Level the 5170 can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A and can support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS Session can be active concurrently and the user can interact with either session alternately. When used with the 3270 Personal Computer AT/G Option Kit 5373-ZZZ or the 3270 Personal Computer AT/GX Option Kit 5373-ZZZ, the 5170 may be attached to the 3274 Control Unit or the Workstation adapter for the 4361 processor. See Personal Computer AT/G and AT/GX Option Kit section for further information. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5170 system unit full feature expansion slot is required. A customer supplied attachment cable is required for host system attachment. Software such as the IBM PC 3270 Emulation Program, Entry Level or other communications software is required. For file transfer, a 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required. For attachment to the 4321 or 4331, specify code #9843 must be installed on the 4321 or 4331. For attachment to the 9370, specify code #6020 must be installed. See 4700 System Descriptions for 4700 attachment prerequisites. OTHER USAGE: Also available on the IBM PC, the IBM PC XT, the XT/370 (5160 Models 568, 588), the AT/370 (5170 Model 099), and the 4700 PC. See individual system descriptions for capabilities and prerequisites.

Enhanced Display Station Emulation Adapter (#2871): Permits a 5170 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Model 12; or remotely via the 5294 Remote Control Unit to emulate a 5250 workstation. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 5170 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 5170 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. One or two host sessions and one personal computer session can be active concurrently. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit. Maximum: One. Customer Setup: Yes.

Displaywriter/Personal Computer Attach Convenience Kit (#3728): Permits a Displaywriter system (without any communications features installed in the diskette unit) to be cable-connected to a 5170

via the serial port of a Serial/Parallel Adapter. The Compact Printer Connector Adapter (#0102) is also required. This attachment allows a Displaywriter to participate in a PC Cluster. When the Displaywriter is attached to a stand-alone 5170, the Displaywriter is used for operational control Functions supported include transfer of documents and files between the Displaywriter and the 5170 including conversion of the document to revisable form text document content architecture (RFTDCA) prior to transfer to the 5170, and conversion from RFTDCA before transfer of documents to the Displaywriter. It is recommended that only DOS print files be transferred to the Displaywriter. Addition functions include the ability to display directories of the 5170 and Displaywriter, deletion of documents and files on either system unit, and an optional foreground execution facility which support alternating between Displaywriter/Personal Computer Attach program functions and Textpack 4 or Textpack 6 functions. Limitations: Each user who is to share an application program on a PC Cluster must be licensed to use that program. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 Unit. Maximum: One. Customer Setup: Yes.

2Mb Expanded Memory Adapter (#3905, P/N 2685193): Provides 2Mb of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30. The 2Mb Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICRO-SOFT.

The 2Mb Expanded Memory Adapter may be installed in any full length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT or Personal System/2 Model 30. However, a double socketed (16-bit) busslot is recommended for the Personal Computer AT and 3270 Personal Computer AT to enable the 2Mb Expanded Memory Adapter to achieve optimum performance.

The 2Mb Expanded Memory Adapter will backfill conventional memory from the 256Kb address to the 640Kb address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to two PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2Mb Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16Kb increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2Mb) through four 16Kb pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: One 2Mb Expanded Memory Adapter. Field Installation: Yes.

Personal System/2 Display Adapter (#4050, 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of one of the following displays: 8503, 8512, 8513 and 8514.

Monochrome Display and Printer Adapter (#4900) (P/N 1504900): Provides for the attachment of the 5151 Monochrome Display Model 001 and one of the supported printers, 4201 Proprinter Model 001, 3852 Color Jetprinter Model 002, 5201 QUIETWRITER Printer, 5216 Wheelprinter Model 002 or any compatible printer. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5170. Limitations: The primary monitor/display adapter must be installed in the 5160 System Unit

and not in a 5161 Expansion Unit. Prerequisites: An available full feature slot in the 5170 Unit. Maximum: One.

Color/Graphics Monitor Adapter (#4910) (P/N 1504910): Provides for the attachment of a color display to the 5170. Either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5153 Color Display Model 001, a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16 foreground and eight background colors are supported in text (character) mode. This attachment also provides support for 4-color medium resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 x 200). 256 characters are available in "text" mode, 128 in medium- or high-resolution graphics. The adapter provides 16Kb of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Limitations: The primary monitor/display adapter must be installed in the 5170 System Unit and not in a 5161 Expansion Unit. Prerequisites: An available full-feature system expansion slot. Maximum: One.

High Speed Adapter (#4920): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner to the 5170 Personal Computer AT. This adapter is installed into full-size expansion slot of 5170 Personal Computer AT system unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS-422-A driver and Receiver. The adapter is designed to the EIA RS-422-A electrical interface and provides one 25-pin "D" shell, mail type connector. Maximum: One. Cable: Communication Adapter Cable (P/N 1502067) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Publication: "Guide to Operations" (6456788). Specify: "Guide to Operations" as follows:

Form Number	Language
GA18-2476	English US
GA09-0378	Canadian French

Publications: Available at a fee for the IBM Personal Computer High Speed Adapter are: "High Speed Adapter Guide to Operations"

Item #	Form #	Language
6456785	GA10-0125	Spanish
6456786	GA09-0378	Canadian French
6456788	GA18-2476	English US

"High Speed Adapter Hardware Maintenance and Service"

Item #	Form #	Language
6455787	SY18-2167	English US

"High Speed Adapter Technical Reference"

Item #	Form #	Language
6455771	SC18-2117	English US

3117 Adapter (#4925): Allows connection of the 3117 Scanner to the 5170 Personal Computer AT. This adapter is installed into full-size expansion slot of the 5170 system unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005) is required. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Publication: "Guide to Operations" (6456831). Specify: "Guide To Operations" as follows:

Form Number	Language
GA18-2477	English US
GA09-0375	Canadian French

Publications: Available at a fee for the IBM Personal Computer 3117 Adapter are: "Guide To Operations for the IBM 3117 Scanner and the 3117 Adapter".

Item #	Form #	Language
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"IBM 3117 Scanner Hardware Maintenance and Service"

Item #	Form #	Language
6456833	SY18-2159	English US
65X1748	SY11-1018	French

"IBM 3117 Scanner Technical Reference"

Item #	Form #	Language
6456837	SC18-2105	English US

IBM Token-Ring Network PC Adapter II (P/N 67X0438): Allows the IBM Personal Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostic and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS) and an attachment cable (#3390) for attaching to the IBM Cabling System data grade or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media. Limitation: The adapter must be installed in the system unit and cannot be installed in the 5161 Expansion Unit.

AT/370 Option Kit (P/N 6236115): The AT/370 Option Kit is a set of two 16-bit option cards that allow the IBM Personal Computer AT to execute many of the S/370 instructions. Following is a description of these cards:

1. AT/370 Processor (PC/370-P2 Card) consists of three microprocessors, a page table and attendant circuitry. The first microprocessor engine executes most of the commonly used fixed point S/370 instructions. The second microprocessor emulates the remaining non-floating point S/370 instructions. The third microprocessor executes S/370 floating point instructions.
2. AT/370 512Kb Memory (PC/370-M2 Card): This Auxiliary RAM card contains 512Kb of parity checked RAM accessible from either the PC/370-P2 Card or the Intel 80286 (the microprocessor for the IBM Personal Computer AT). Concurrent requests for memory accesses are arbitrated, with the 80286 accesses receiving highest priority. 128Kb of this memory is viewed in Personal Computer mode as a contiguous storage area that begins at the end of the 512Kb of required Personal Computer memory in the IBM Personal Computer AT. Therefore, in Personal Computer mode the IBM Personal Computer AT/370 has only 640Kb of usable memory. When in this native mode the memory operates marginally slower than the 512Kb of memory on the systems board. The PC/370-P2 Card views this memory as two separate areas which are not contiguously addressable. The area from 0 to 480Kb is addressed from 0 to 480Kb and is real S/370 space. The area from 480Kb to 512Kb is control store for the second microprocessor on the PC/370-P2 Card. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: 1) Two adjacent 16-bit slots (#4 and #5 recommended) -- 2) Software such as the VM/PC Licensed Program 1.1 (6024175) -- 3) 512Kb of memory on Personal Computer AT Systems Board -- 4) An Optional 3278/79 Emulation Adapter (#2507) may be installed with this AT/370 Kit if host interactive or file transfer sessions are required.

4700/PC Option Kits: The following 4700 Personal Computer Option Kits are provided to permit attachment of 4700 Finance Communication System input devices and 4700 Finance Communication Printers (all models of 4710, 4715 and 4720) and.

Financial Input Adapter (#6065)
Financial Output Adapter (#6058)

The following 4700 Personal Computer Option Kit is provided to permit encryption/decryption capabilities in the personal computer. Data encrypted/decrypted in the personal computer may be decrypted/ encrypted in the 4701/02 using the same algorithm.

Financial Security Adapter (#6069)

4700 Personal Computer Financial Input Option Kit (#6065): This option allows the attachment of 4704 Finance Keyboards, Magnetic Readers, Magnetic Reader/Encoder, 4706 Document Codeline and Magnetic Reader, clear and encrypting PIN pads using DOS 3.0 or DOS 3.1. Each option kit contains the Financial Input adapter card, the Financial Input Connector Assembly, installation and problem determination procedures, diagnostic diskette, microcode diskette with device drivers and configuration customization, and a microcode users guide. The keyboard attachment is transparent to DOS applications. All keyboards (except the PC/AT and Enhanced PC keyboards) are plugged into the connector assembly. The PC/AT and the Enhanced PC keyboards always connect to the system unit keyboard adapter. Keyboards may be combined in the following way:

- Finance Administrative Keyboard stand-alone.
- Finance Expanded Alphameric Keyboard stand-alone.
- PC/AT or Enhanced PC Keyboard stand-alone.
- Finance Expanded Alphameric Keyboard with Finance Function Keyboard.
- Finance Alphameric Keyboard with Finance Function Keyboard.

One magnetic reader or reader/encoder or 4706 Document Codeline and Magnetic Stripe Reader and one clear or encrypting pin pad may be attached in addition to the keyboard combinations listed above. They may be accessed by DOS applications via standard DOS device drivers provided. For more information about finance keyboards, magnetic readers, magnetic reader/encoder, and clear or encrypting PIN pads, see 4704 in "Machine" section. For more information about the 4706 Document Codeline and Magnetic Stripe Reader, see 4706 in "Machine" section. Prerequisite: An IBM Personal Computer AT with 256Kb on system board. Maximum: One. Limitations: This adapter must be installed in the system unit and not in an expansion unit.

4700 Personal Computer Financial Output Option Kit (#6068): This option allows the attachment of a single Finance Printer from this list using DOS 3.0 or DOS 3.1.

- 4710 Receipt/Validations Printer
- 4715 Continuous Forms Printer
- 4720 Forms/Passbook Printer Models 1, 2, 3, 4,

The adapter card handles the Banking Loop protocol and data stream to the devices. It supports a single device with one or two logical device addresses. It attaches only devices that adhere to the 4700 Universal Device Processor protocols. Each option kit contains the Financial Output adapter card, the Financial Output Cable, installation and problem determination procedures, diagnostic diskette, microcode diskette with device drivers and configuration customization, and a microcode users guide. For more information about finance output devices, see 4710, 4715, 4720, 4723 in "Machine" section. Prerequisite: An IBM Personal Computer AT with 256Kb on system board. Maximum: One. Limitations: This adapter must be installed in the system unit and not in an expansion unit. With this adapter installed memory is limited to 576Kb.

4700 Personal Computer Financial Security Option Kit (#6069): It allows an application program using DOS 3.0 or DOS 3.1 to encrypt and decrypt data for communications and files. The user can have the added security of encryption for sensitive communications data transmitted from the personal computer to another source over communications lines. The user can also protect sensitive programs and data stored on personal computer files via encryption. Each option kit contains the Financial Security adapter card, installation and problem determination procedures, diagnostic diskette, microcode diskette with adapter support, and a microcode users guide. Included is support to set the master and session keys. The functions of the adapter may be accessed by DOS applications via standard DOS interfaces provided. The algorithm used is the same as that used in the 4701/02. Prerequisite: An IBM Personal Com-

puter AT with 256Kb on system board. Maximum: One. Limitations: This adapter must be installed in the system unit and not in an expansion unit.

(Except LAD > PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD > The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD > Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

- Width - 20.32mm (0.8 in.)
- Depth - 336mm (13.26 in.)
- Height - 107.95mm (4.25 in.)
- Weight - 0.34kg (0.75 lbs.)

Operating Environment:

- Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
- Relative Humidity: 8 to 80 percent
- Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <)

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512Kb of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128Kb Memory, 5.25 inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128Kb Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128Kb memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT
- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128Kb or 512Kb of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.

- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.
- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a

maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128Kb or 512Kb of memory, four or eight ports, and will be shipped with either 5.25 inch or 3.5 inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25 inch or 3.5 inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255: 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512Kb Memory Expansion (#6242, P/N 00F5529): Replaces the 128Kb of Co-Processor memory with 512Kb of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512Kb.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to

eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

IBM Enhanced Graphics Adapter (EGA) Jumper Card (#6583)(P/N 8575146): Provides an external synchronization from the IBM 4055 InfoWindow Display to allow overlay of text and graphics stored on the IBM Personal Computer with video stored on a video disc player. Technical Information: The IBM Enhanced Graphics Adapter Jumper Card attaches to the feature connector of the IBM Enhanced Graphics Adapter and to the IBM General Purpose Interface Bus Adapter (IRQ connector Row B, pins 2-6). Maximum: One. Field Installation: Yes. Prerequisites: IBM Enhanced Graphics Adapter and IBM General Purpose Interface Bus Adapter. Customer Setup: Yes. Publications: Enhanced Graphics Adapter Jumper Card Guide to Operations (GA27-3744, P/N 8575145); Enhanced Graphics Adapter Jumper Card Hardware (SX27-3756, P/N 8575147).

8100 PC Adapter (#7630): Allows connection of a 5170 to an available station address on a local or remote RLOOP in an 8100 Information System configuration. Remote attachment of the 5170 requires a 3843 Loop Control Unit. This feature provides an adapter card, a 5-1/4" diskette with the 8100 PC Adapter Programs, the external cable required for attachment to an 8100 loop station connector, the 8100 PC Adapter User's Manual and the 8100 PC Adapter Keyboard Template. When the 5170 is loop-connected to an 8100 operating with DPCX/DOSF Release 4, it allows the following functions to be supported: 3270 Display emulation, 5287 Printer emulation support, Bidirectional file transfer between the 5170 and the 8100, S/370 host file transfer and screen capture to print the screen image to the 5170 printer or diskette. Limitations: The adapter is mutually exclusive with the SDLC adapter and cannot operate concurrently with an Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit. Maximum: One. Customer Setup: Yes.

Multiprotocol Communications Adapter (#8001): This adapter provides an EIA RS-232-C interface and in addition this option provides the user with the capability to select under program control the communications protocol that is to be used. Protocols supported are: Async, Bisync, or SDLC. In asynchronous mode the user may select five, six, seven or eight bit characters with 1, 1-1/2, or 2 stop bits. In synchronous mode the adapter operates in half-duplex mode. Maximum transmission rate is 9600 bits per second (synchronous mode only) or as generated by the attached modem or other data communication equipment. The interrupt levels can be programmed to be identical to the PC Communication SDLC and Bisync Adapters, requiring interrupt level 3 and 4 or selected to operate on either level 3 or 4. One Multiprotocol Communications Adapter can coexist with one Binary Synchronous Communications Adapter or with one SDLC Communications Adapter or with the Serial/Parallel Adapter (Note: Coexist means operating one adapter at a time and the unused adapter's interrupts disabled). One Multiprotocol Communications Adapter can operate concurrently with one Serial/Parallel Adapter if the Multiprotocol Communication Adapter uses a different interrupt level (the Serial/Parallel Adapter must be configured as secondary). Two Multiprotocol Communications Adapters can operate concurrently if the interrupt level of the Serial/Parallel Adapter has been disabled by the communications program. The adapter can be plugged into either a 16-bit or 8-bit option slot. Maximum: Two. Cable: The Communications Adapter Cable (#2067) allows the user to connect the MPCA card to a modem via a plug at the rear of the system unit. The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. Prerequisites: An available special feature (small) or full-feature system expansion slot is required. Customer Setup: Yes.

Second Store Loop Adapter (#8002): This adapter provides for the attachment of the 5170 Models 839, 849 and 899 to the store loop of another 5170 Store Controller and in conjunction with the 4680 Operating System /Version 1 Release 2 will monitor that store loop for Store Controller activity. When controller inactivity becomes evident the monitoring Store Controller will take over control of that store loop. Users of this "backup" feature should review their requirements with their IBM Marketing Representative concerning number of point of sale terminals involved and throughput requirements. The store loop adapter operational speed is 38,400 bps. The adapter also contains two 2,000 character battery protected data buffers to ensure that data is correctly written to the 5170 disk before that buffer is released for the next operation. The adapter can be plugged into either a 16-bit or 8-bit option slot. Maximum: One. Prerequisites: 5170 Model 839, 849 or 899. Customer Setup: Yes.

Store Loop Cable (#8003): This cable provides the connection between the Second Store Loop Adapter (#8002) and the store loop wiring. The shielded cable is 4m (13 ft) long and has an IBM Cabling System data connector (self-shorting) at the end that connects to the store wiring and an SDL plug at the end that connects to the Second Store Loop Adapter at the rear of the system unit. Prerequisites: Second Store Loop Adapter (#8002) on the 5170 Model 839, 849 or 899.

4683 Model 2 Attachment Adapter Kit (#8314) (P/N 83X7654): The 4683 Model 2 Attachment Adapter Kit provides the necessary adapter card, software, diagnostics, installation aid and instructions for attaching one or two 4683 Model 2 to an IBM Personal Computer AT. The kit consists of the following:

- IBM 4683 Model 2 Adapter Card and Wrap Plug
- Ship group that contains:
 - Lock Accessory Kit
 - Diskette Kit

Publications:

- IBM 4683 Model 2 Attachment Adapter Kit: Installation Guide
- IBM 4683 Model 2 Attachment Adapter Kit: Problem Determination Guide
- IBM 4680 Store System Terminal Operations Guide
- Guide to Operations IBM Personal Computer: 4683 Model 2 Attachment Adapter

The combination of the 4683 Model 2 and Attachment Adapter Kit connected to and installed on the IBM Personal Computer, described in the specified operating environment, provides the capability to attach up to two 4683 Model 2 Point-of-Sale Terminals. The Attachment Kit is applicable to all small store environments where an in-store IBM Personal Computer XT and Application Program are available to meet the requirements. Limitations: Maximum of One Attachment Adapter. Prerequisites: An available full-feature slot in the system unit. Field Installation: Yes. Customer Setup: Yes.

3270 PERSONAL COMPUTER AT/G AND AT/GX OPTION KITS

The 3270 Personal Computer AT/G and AT/GX Graphics Displays are now available for attachment to the Personal Computer AT 5170 System Units, Models 319 and 339, by means of Option Kits. The Option Kits consist of an adapter card and cable for installation in the 5170 System Unit. The Option Kits allow the attachment to the 5170 of the 5279 Color Display and the 5379 Color or Monochrome Displays, via their respective Display Attachment Units, and the 5277 Mouse or the 5083 Model 2 Tablet.

The Personal Computer AT/G and AT/GX Option Kits can be installed in the 5170 Models 319 and 339 System Units. The attachment to these models maintains compatibility with existing hardware and software products available for the 3270-PC AT/G and AT/GX. When installed in the 5170 Model 319 the Personal Computer AT keyboard is supported. When installed in the 5170 Model 339 the Enhanced Personal Computer Keyboard is supported. APL keyboard nomenclature is provided with GCP 3.21 by means of stick-on labels for use with the Enhanced Personal Computer keyboard and the Personal Computer AT keyboard.

To take full advantage of the graphics and host capability of the 3270 Personal Computer AT/G and AT/GX, the 3270-PC Graphics Control Program (GCP) Version 3 Release 2.1 is required.

System Attachment: An 3278/79 Emulation Adapter (#5050) may be installed with the option kit to allow attachment to the 3274 Controller in either Distributed Function Terminal (DFT) or Control Unit Terminal (CUT) mode. DFT mode attachment is required to use the graphics functions of the 3270 Personal Computer AT/G and AT/GX Workstations. The 3274 must have Configuration Support D at level 61 or higher, and at least 192K bytes of memory. The 3274 Models 31A, C, D or 41A, C, D or 51C or 61C may be used. The following RPQs in the 3274 Control Unit are not allowed when a terminal operating in CUT mode is attached; they relate to keyboard changes: #8K0809, #8K0931, #8K0949, #8K0988, #8K1011, #8K1012, #8K1013, #8K1037, #8K1056, #8K1057, #8K1134, #8K1159, #8K1160, #8K1162, #8K1163, #8K1169, #8K1170, #8K1195, #8K1198.

The multiple logical terminal facility of 3270-PC Graphics Control Program allows the user to designate up to four terminal addresses in a single workstation. This requires one primary and up to four logical addresses for each physical port in the 3274 control unit. When planning an installation, consideration must be given to the number of logical and physical addresses that are to be used, compared with the maximum number of addresses and ports that are available. The number of addresses and ports is dependent on the model of 3274 and the method of system attachment. In addition to these limitations, it should be noted that there may also be performance considerations that affect the maximum number of logical and physical terminals that can usefully be connected to the 3274. Category "B" terminals (e.g. 3277 Display Stations) cannot be used on the 3274 when the 3274 is customized to support Workstations operating in DFT mode.

RPQ #8K1311: 3270-PC/G/GX Performance Enhancement is available for the 3274 Models 31A and 41A only (SNA) which have Configuration support D, rel 64.1 or higher. The RPQ is CSU and will enhance the response time for large graphics applications by reducing the control unit processing times.

The 3278/79 Emulation Adapter may also be used to allow attachment to the Workstation Adapter (WSA) of a 4361 Processor in either DFT or CUT mode. The WSA is a non-SNA controller with function and performance characteristics similar to the 3274-41D, integrated into the 4361 Processor. DFT mode attachment is required to use the graphics functions of the Personal Computer AT/G and Personal Computer AT/GX. It is provided by a mandatory EC on all 4361 Processors:

- EC 36442 for the 4361 Model 3
- EC 364436 for the 4361 Models 4 and 5

The maximum number of physical terminals that can be attached to the WSA is 32 in any combination of DFT and CUT modes. The multiple logical terminal facility of the 3270-PC Graphics Control program allows the user to designate a minimum of one and a maximum of four logical terminal addresses that can be assigned in DFT mode on the WSA is 63. This means that if Workstations have multiple logical addresses, then the total number of Workstations that can be attached is reduced. The logical addresses for the WSA are pre-assigned by the 4361 and may be changed by using the WSA configuration program of the 4361. Category "B" terminals are not supported on the WSA.

Compatibility: The following IBM Personal Computer AT Options may be installed in conjunction with the 3270 Personal Computer AT/G and AT/GX Option Kits and the relevant 5170 System Unit:

- 256Kb Memory Module Kit (P/N 6450202)
- 512Kb Memory Expansion Card (#0203) (P/N 6450203)
- 20Mb Fixed Disk Drive (#0205) (P/N 6450205)
- 1.2Mb Diskette Drive (#0206) (P/N 6450206)
- 360Kb Diskette Drive (#0207) (P/N 6450207)
- 128Kb Memory Expansion Card (#0209) (P/N 6450209)
- 30Mb Fixed Disk Drive (#0210) (P/N 6450210)
- Maths Co-processor (#0211) (P/N 6450211)
- PC Net Adapter (#0213) (P/N 6450213)
- Serial/Parallel Adapter (#0215) (P/N 6450215)
- 128/640Kb Memory Expansion Option Kit (#3338) (P/N 6450338)
- 512Kb Memory Module Kit (#3339) (P/N 6450339)

- 512Kb/2Mb Memory Expansion Option (#3343) (P/N 6450343)
- Memory Expansion Adapter (#3395) (P/N 55X3560)
- Memory Module Kit (#3397) (P/N 55X3547)
- 30Mb Fixed Disk Drive Upgrade Kit (#0468)
- 256Kb Memory Expansion Card (#1209) (P/N 1501209)
- GPIB Adapter (#1503) (P/N 6451503)
- 3278/79 Emulation Adapter (#2507)
- 3278/79 Enhanced Emulation Adapter (#5050)
- Enhanced Display Station Emulation Adapter (#3690) - for 5250 Terminal Emulation (see RPQ S40281)
- Mono Display/Printer Adapter (for Personal Computer AT/GX (#4900) (P/N 1504900)
- Printer Cable (P/N 1525612)
- Token-Ring Adapter Cable (P/N 6339088)
- Token-Ring Adapter (P/N 6339100)

Other IBM Personal Computer AT Options may be usable but need to be tested by the user to assure viability. In particular the diagnostic procedures provided with such options may not operate correctly.

Publications: The following publications are included with the Option Kit for the Personal Computer AT/G.

- Guide to Operations
- Maintenance Information Manual

The following publications are included with the Option Kit for the Personal Computer AT/GX.

- Guide to Operations
- Maintenance Information Manual

3270 Personal Computer AT/G Option Kit (5373-ZZZ): The 3270 Personal Computer AT/G Option Kit allows a 5279 Color Display to be attached to a 5170 Model 319 and 339 System Unit via the 5278 Display Attachment Model 2.

The 3278/79 Emulation Adapter (#5050) may be installed with this option kit for host communication using the 3270 Extended datastream.

The 3270 Personal Computer AT/G Option Kit consists of:

- The Display/Mouse/Tablet Adapter.
- An internal cable to attach the mouse/tablet socket to the adapter.
- Guide to Operations Manual.
- Maintenance Information Manual.
- Customer Diagnostics diskette, Advanced Diagnostics diskette and additional text pages.

The option kit may be installed in 5170 Models 319 and 339.

Limitations: The installation requires the removal of any Personal Computer Display Adapters. The attachment of a 3270-PC keyboard or 3270-PC APL keyboard is not supported. Field Installation: Yes. Customer Setup: Yes. Prerequisite: An available full feature system expansion slot.

FCC Classification: The 5279 Color Display and the 5278 Display Attachment Unit are FCC Class A machines. Installation of a Personal Computer AT/G Option Kit in an 5170 System Unit does not change the FCC rating of the System Unit. The IBM Personal Computer AT/G workstation FCC classification is Class A.

3270 Personal Computer AT/GX Option Kit (5373-ZZZ): The 3270 Personal Computer AT/GX Option Kit allows a 5379 Display Model C01 or M01 to be attached to a 5170 Model 319 and 339 System Unit via the 5378 Display Attachment model C01 or M01.

The 3278/79 Emulation Adapter (#5050) may be installed with this option kit for host communication using the 3270 Extended datastream.

The 3270 Personal Computer AT/GX Option Kit consists of:

- The Display/Mouse/Tablet Adapter.
- An internal cable to attach the mouse/tablet socket to the adapter.
- Guide to Operations Manual.
- Maintenance Information Manual.

- Customer Diagnostics diskette, Advanced Diagnostics diskette and additional text pages.

The option kit may be installed in 5170 Models 319 and 339.

Limitations: The installation requires the removal of any Personal Computer Display Adapters, except the Mono Display/Printer Adapter, which may be used as an alphanumeric Display in Dual Screen operation. The attachment of a 3270-PC keyboard or 3270-PC APL keyboard is not supported. Field Installation: Yes. Customer Setup: Yes. Prerequisite: An available full feature system expansion slot.

FCC Classification: The 5379 Color or Monochrome Display and the 5378 Display Attachment Unit are FCC Class A machines. Installation of a Personal Computer AT/GX Option Kit in a 5170 System Unit does not change the FCC rating of the System Unit. The IBM Personal Computer AT/GX workstation FCC classification is Class A.

IBM Realtime Interface Co-Processor (P/N 58X7284, 90X6219, 90X6218, 90X6221): The IBM Realtime Interface Co-Processor is an interface subsystem for IBM Industrial Computers and IBM Personal Computers. A Realtime Interface Co-Processor (ARTIC) in conjunction with its software support provides support for attachment of Programmable Controllers in industrial applications.

The IBM Realtime Interface Co-Processor will be available with either 128Kb or 512Kb of standard memory and either 5.25 or 3.5-inch program media.

● Standard Features

- Advanced high-performance Intel(1) 80186 micro-processor
- 128Kb or 512Kb of dual-ported memory with parity for error detection (128Kb expandable to 256Kb, 512Kb expandable to 1024Kb)
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the co-processor storage and its interface ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Two serial I/O ports
- Data rates up to 64K bps full duplex with external clocking on one port, while the second port is operated at 19.2K bps full duplex.
- Transmit and Receive status-indicators
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support
- CRC generation and checking
- Pluggable Interface Boards
- Custom Interface Board support
- Byte-wide I/O Interface available at Interface Board Connector
- All external signals available at Interface Board connector
- Five programmable hardware timers
- Watchdog timer
- Watchdog timer status-indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - ▲ Hardware setup
 - ▲ Software setup
 - ▲ Problem determination procedures
 - ▲ Customer diagnostics diskette.
- Realtime Control Program microcode
 - ▲ Multi-tasking, preemptive priority
 - ▲ Co-Processor memory management
 - ▲ Timer support
 - ▲ Watchdog timer support
 - ▲ Queue management
 - ▲ Inter-task communications
 - ▲ Initial Program Load.
- ROM-based automatic power-on self-test of Co-processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

● Option Kit Features

- EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001)
- EIA RS-422-A Interface Board (P/N 70X9002)
- CCITT V.35 Interface Board (P/N 70X9003)
- 20ma Current Loop Interface Board (P/N 70X9004)
- Realtime Interface Co-Processor 128Kb Memory Expansion (P/N 58X7289) (can only be used with features P/N 58X7284 and P/N 90X6218)
- Realtime Interface Co-Processor 512Kb Memory Expansion (P/N 76X1019) (can only be used with features P/N 90X6219 and P/N 90X6221)
- RS-232-C Direct Attach Interface Cable (P/N 58X7290)
- RS-232-C Modem Attach Interface Cable (P/N 58X7291)
- IBM Realtime Interface Co-Processor Technical Reference (P/N 60X8776)
 - ▲ Hardware technical information
 - ▲ Realtime Control Program microcode description
 - ▲ Interface Board design information.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (P/N 58X7292)
 - ▲ Problem determination procedures
 - ▲ Advanced Diagnostics Diskette
 - ▲ Wrap connector
- CCITT V.35 Interface Cable (P/N 58X7293)

The Realtime Interface Co-Processor has been designed for use in industrial applications of the IBM Industrial Computers and IBM Personal Computers. The Co-Processor is compatible with the 5531, 7531, 7532, 5160, and 5170 computer systems. The 5531 Industrial Computer and 5160 Personal Computer are based on the Intel(1) 8088 microprocessor. The 7531 and 7532 Industrial Computers and 5170 Personal Computer are based on the Intel(1) 80286 microprocessor.

The Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are two independent serial ports that operate at speeds up to 64K bps using direct memory access. One port can operate at 64K bps full duplex, while the second is operated at a maximum of 19.2K bps full duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the Co-Processor is designed to accept two optional interface boards or user developed custom interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the Interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20ma Current Loop Interface Board
- CCITT V.35 Interface Board.

A maximum of two Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be found in the optional "Realtime Interface Co-Processor Technical Reference" (P/N 60X8776).

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit mode on the 5531 and 5160 and in 8-bit or 16-bit mode on the 7531, 7532 and 5170.

The Realtime Interface Co-Processor will be available in two memory capacities, 128Kb and 512Kb, and will be shipped with either 5.25-inch or 3.5-inch program media.

- IBM Realtime Interface Co-Processor with 128Kb of memory and 5.25-inch program media (P/N 58X7284)

- IBM Realtime Interface Co-Processor with 128Kb of memory and 3.5-inch program media (P/N 90X6218)
- IBM Realtime Interface Co-Processor with 512Kb of memory and 5.25-inch program media (P/N 90X6219)
- IBM Realtime Interface Co-Processor with 512Kb of memory and 3.5-inch program media (P/N 90X6221)

All Realtime Interface Co-Processor features are functionally equivalent. Features P/N 58X7284 and P/N 90X6218 are shipped with 128Kb of memory, upgradeable to 256Kb, and features P/N 90X6219 and P/N 90X6221 are shipped with 512Kb of memory, upgradeable to 1024Kb. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128Kb Memory Expansion Option (P/N 58X7289) (Can only be used with features P/N 58X7284 and P/N 90X6218)
- 512Kb Memory Expansion Option (P/N 76X1019) (Can only be used with features P/N 90X6219 and P/N 90X6221)

Detailed technical information on the Realtime Interface Co-Processor is provided in the optional Realtime Interface Co-Processor Technical Reference (P/N 60X8776).

Realtime Control Program

The Realtime Control Program is microcode for the Realtime Interface Co-Processor. It is included with the Co-processor feature and is shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The Realtime Control Program microcode provides a realtime, multi-tasking operational environment for supporting user applications running on the Realtime Interface Co-Processor. The Realtime Control Program microcode is loaded from the system unit memory to the Realtime Interface Co-Processor memory. Once loaded, the Realtime Control Program microcode initializes itself and the Realtime Interface Co-Processor. It then signals the system unit processor that it is loaded and ready.

The Realtime Control Program microcode supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the Realtime Control Program microcode may communicate with another task running under the control program or with an application program running in the system unit.

The Realtime Control Program microcode provides support for interfacing IBM Industrial Computer or Personal Computer applications to the Realtime Control Program microcode and uses the IBM PC Macro Assembler as the program-preparation facility.

The Realtime Control Program microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 256 software timers with increments ranging from 5 ms to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Intertask communications is accomplished by the wait/post mechanism. Data may be passed between tasks by user queues.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Realtime Interface Co-Processor upon failure. It will also switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the Realtime Control Program microcode is provided in the optional Realtime Interface Co-Processor Technical Reference (P/N 60X8776).

The Realtime Interface Co-Processor can coexist with the following IBM Industrial and Personal Computer adapters:

- 64/256Kb Memory Expansion Option (P/N 1501013)
- 128Kb Memory Expansion (P/N 6450209)
- 512Kb Memory Expansion (P/N 6450203)

- PC Network Adapter (P/N 6450213)
- Enhanced Color Graphics Adapter (P/N 1501200)
- Combination Adapter II (P/N 6523466)
- Binary Synchronous Communications Adapter (P/N 1501204)
- SDL/C Communications Adapter (P/N 1501205)
- Asynchronous Communications Adapter (P/N 1502074)
- Personal Computer Cluster Adapter (P/N 1501206)
- Data Acquisition and Control Adapter (P/N 6451502)
- General Purpose Interface Bus Adapter (P/N 6451503)
- Color/Graphics Monitor Adapter (P/N 1504910)
- Serial/Parallel Adapter (P/N 6450215)
- 10Mb Fixed Disk Drive/Adapter Kit (P/N 6523704)
- Printer Adapter (P/N 1505200)
- Monochrome Display and Printer Adapter (P/N 1504900)
- 3278/79 Emulation Adapter (P/N 1602507)
- XT/370 Option Kit (P/N 1503891)
- Token-Ring Network PC Adapter (P/N 6339100)
- Game Control Adapter (P/N 1501300)
- Enhanced Display Station Emulation Adapter (P/N 6403690)
- 5253 Emulation Installation Convenience kit
- 5250 Emulation Convenience Kit (P/N 6403692)
- AT/370 Option Kit (P/N 6236115)
- XT/370 Option Kit (P/N 1602509)

Publications

The Realtime Interface Co-Processor will be shipped with one manual:

- "IBM Realtime Interface Co-Processor Guide to Operations"

The Guide to Operations covers the Realtime Interface Co-Processor and the optional Interface Boards and cables. The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Realtime Interface Co-Processor, optional Interface Boards, and cables. This publication is intended for anyone who will be installing, using, or programming the Realtime Interface Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available from Mechanicsburg.

The following manuals are available for purchase:

- "IBM Realtime Interface Co-Processor Technical Reference" (P/N 60X8776)

The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Also included is detailed technical information on Interface Board design. It describes the interface between the Realtime Interface Co-Processor and the pluggable Interface Board. Detailed information on the programmer interfaces to the Realtime Control Program microcode is included.

The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Realtime Interface Co-Processor, Realtime Control Program microcode, optional Interface Boards and cables.

- "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (P/N 58X7292)

The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Realtime Interface Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and a 15-pin wrap-connector for use when running Co-Processor diagnostics.

Limitations

Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed in the "Compatibility" section of this document are not supported.

The Realtime Interface Co-Processor is not designed to run DOS applications but is intended for industrial applications written to interface with the Realtime Control Program microcode.

In most system configurations, one Realtime Interface Co-Processor can be installed in the 5531 and 5160 computers, and up to three can be installed in the 7531, 7532, and 5170 Computers. For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 80286-based IBM Industrial and Personal computers prohibits an 8-bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a 16-bit adapter (Realtime Interface Co-Processor) within the same region.

See the "IBM Realtime Interface Co-Processor Technical Reference" for complete details.

Prerequisites

The Realtime Interface Co-Processor must be installed in one of the following systems:

- 5531 Industrial Computer
- 7531 Industrial Computer
- 7532 Industrial Computer
- 5160 Personal Computer
- 5170 Personal Computer

Customer Setup (CSU): The Realtime Interface Co-Processor and all options are customer setup (CSU). CSU allowance is one (1) day. Detailed setup instructions are included with each co-processor card. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

Special Features

EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.

EIA RS-422-A Interface Board (P/N 70X9002): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4000 ft, however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

CCITT V.35 Interface Board (P/N 70X9003): Adapts one of the Co-Processor's serial ports for compatibility with CCITT V.35 interfaces.

20ma Current Loop Interface Board (P/N 70X9004): Adapts one of the Co-Processor's serial ports for compatibility with 20ma interfaces. The current loop Interface Board also has the capability to provide the 20ma current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment. See the IBM Realtime Interface Co-Processor Technical Reference for details.

Realtime Interface Co-Processor 128Kb Memory Expansion (P/N 58X7289): Expands the Realtime Interface Co-Processor (P/N 58X7284 and P/N 90X6218) memory from 128Kb to 256Kb. Only one 128Kb Memory Expansion Option may be installed.

Realtime Interface Co-Processor 512Kb Memory Expansion (P/N 58X7291): Expands the Realtime Interface Co-Processor (P/N 90X6219 and P/N 90X6221) memory from 512Kb to 1024Kb. Only one 512Kb Memory Expansion Option may be installed.

EIA RS-232-C Direct Attach Interface Cable Option (P/N 58X7291): Allows the user to connect one port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable

terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001) is installed.

EIA RS-232-C Modem Attach Interface Cable (P/N 58X7291): Allows the user to connect one port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001) is installed.

CCITT V.35 Interface Cable (P/N 58X7293): Allows the user to connect one port of the Realtime Interface Co-Processor to a CCITT V.35 modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the CCITT V.35 Interface Board (P/N 70X9003) is installed.

Specified Operating Environment:

- Intel(1) 80186 Microprocessor
- 7.37 MHz clock speed
- 20-bit addressing
- 16-bit data path
- 128Kb or 512Kb Dynamic RAM
- 16Kb ROM

Operating Environment:

- Electrical
 - Operating voltages:
 - ▲ +5V DC
 - ▲ +12V DC
 - ▲ -12V DC
 - ▲ -5V DC
 - Current requirements
 - ▲ Realtime Interface Co-Processor
 - △ +5V DC at 2.1a
 - ▲ RS-232-C/CCITT V.24 Interface Board
 - △ +5V DC at 80ma
 - △ +12V DC at 35ma
 - △ -12V DC at 22ma
 - ▲ RS-422-A Interface Board
 - △ +5V DC at 120ma
 - ▲ 20ma Current Loop Interface Board
 - △ +5V DC at 35ma
 - △ +12V DC at 52ma
 - △ -12V DC at 45ma
 - ▲ CCITT V.35 Interface Board
 - △ +5V DC at 150ma
 - △ -5V DC at 70ma
 - △ +12V DC at 15ma
 - △ -12V DC at 15ma
- FCC Class A

Installation of the Realtime Interface Co-Processor changes the FCC rating of the 5160 and 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. See the "IBM Realtime Interface Co-Processor Guide To Operations" for the FCC Statement.

Hardware Requirements

One of the following IBM system units is required for operation of the Realtime Interface Co-Processor.

- 5531 Industrial Computer Models 011 and 021
- 7531 Industrial Computer Model 041
- 7532 Industrial Computer Model 041
- 5160 Personal Computer Models 087, 068, 078, 267, 268, 277, 278, 088, and 089
- 5170 Personal Computer Models 068, 099, 239, 319, and 339

Software Requirements

The IBM Personal Computer Disk Operating System (DOS), version 2.1, 3.0, 3.1, or 3.2 is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- IBM Realtime Interface Co-Processor Technical Reference (P/N 60X8776)
- Realtime Control Program DOS Support (P/N 67X1250 and P/N 85X2000)
- Realtime Interface Co-Processor C Language Support (P/N 85X2034 and P/N 85X1996)
- Realtime Interface Co-Processor Developer's Kit (P/N 67X1251 and P/N 85X2001)

Enhanced Memory Expansion Adapter (P/N 74X8635, #8635): This multifunction adapter provides up to 12Mb of memory, split memory addressing, a parallel printer port, and an asynchronous serial communications port. The adapter comes with Above Disc to convert extended memory to expanded memory for EMS applications. Memory for the adapter is sold separately. Memory module kits can be added in increments of .5Mb, 1Mb, or 2Mb up to a maximum of 3Mb, 5Mb, 6Mb, or 12Mb per adapter. A maximum of five adapters (4 in an XT-286) may be installed, providing a maximum of 15Mb of additional memory. The split memory addressing feature allows the base memory to be filled up to the 640Kb limit with the remaining adapter memory automatically becoming part of the expansion memory area.

The asynchronous serial communications port is a 9-pin D-shell RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer, or other serial device. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel printer port provides a 25-pin connector to connect a parallel printer.

One 16-bit expansion slot is required for each adapter. Adapters are customer installable. A maximum of two serial and three parallel ports are supported by the 5170. One serial and one parallel port is included in the 5170 models, except the 5170 Model 68. Adapters can be used to provide up to two serial and two parallel ports.

Machine requirements: The Enhanced Memory Expansion Adapter can be installed in all models of the IBM Personal Computer AT (5170). One 16-bit expansion slot is required for each adapter. The adapter is sold without memory. Therefore, memory must be purchased separately. The adapter can use the 512Kb Memory Module Kit (#3397) and the 1Mb Memory Module Kit (#3402) as well as the new 2Mb Memory Module Kit (#7833).

The adapter conforms to FCC Class B specifications.

Programming requirements: Use of Above Disc requires DOS 3.0 or higher.

Memory Module Kit (P/N 74X7833, #7833): Expands the memory capacity of the Memory Expansion Adapters (#3395), (#3400), and

MACHINES

the Enhanced Memory Expansion Adapter (#8635) in increments of 2Mb up to a maximum of 12Mb per adapter. Each kit consists of two 1,024Kb memory modules which are inserted into memory module sockets on the adapter. A maximum of six kits can be added to each adapter. Kits are customer installable. Installation on Memory Expansion Adapters (#3395) and (#3400) will require removing all currently installed 256Kb and 512Kb memory modules.

- Memory expansion up to 12Mb.
- Split memory addressing.
- Parallel printer port and asynchronous communications port.
- New easy to install 1Mb memory module.
- Supports IBM Operating System/2.
- Supports LIM EMS with Above Disc.
- One year limited warranty.

256Kb Memory Kit (P/N 6450202)
20Mb Fixed Disk Drive (P/N 6450205)
Serial/Parallel Adapter (P/N 6450215)

Customers can upgrade from Model 099 to Model 599 by installing the following features:

AT/370 Option Kit (P/N 6236115)
3278/79 Emulation Adapter (P/N 1602507)

ACCESSORIES (NONE)

MODEL CONVERSIONS

Customers can upgrade from Model 068 to Model 099 by installing the following features:

SUPPLIES (NONE)

5170 PERSONAL COMPUTER AT Models 319 and 339

PURPOSE

The 5170 Enhanced Personal Computer AT is designed for professional applications, office environments, and increased personal productivity. It includes many advanced technology features including increased performance, advanced microprocessor, high-capacity diskette drives, high-capacity disk drives, large memory capacity and advanced co-processor. The 5170 provides compatibility with most existing hardware and software products for the 5170 Personal Computer AT family.

MODELS

Model 319: System unit/keyboard, Intel 80286 microprocessor at 8 MHz, 512Kb memory, high-capacity 1.2Mb diskette drive, fixed disk and diskette drive adapter, serial/parallel adapter, 30Mb fixed disk drive, ROM based BASIC language, keylock and clock/calendar with battery backup.

Model 339: System unit/keyboard, Intel 80286 microprocessor at 8 MHz, 512Kb memory, high-capacity 1.2Mb diskette drive, fixed disk and diskette drive adapter, serial/parallel adapter, 30Mb fixed disk drive, ROM based BASIC language, keylock, clock/calendar with battery backup and Enhanced Personal Computer Keyboard.

Technical Information: The system unit contains the following major functional components:

- Advanced High-Performance Intel 80286 Microprocessor with 8 MHz Clock Speed
- ROM Based Automatic Power-On Self-Test of System Components
- BASIC Language Interpreter in 64Kb ROM:
 - Access Time - 150 ns
 - Cycle Time - 355 ns
- 8088 Compatible Real Address Mode
- Limited Protected Virtual Address Mode Functions (see Technical Reference Manual 6280070 - # 0070)
- 512Kb of Dynamic RAM on the System Board:
 - Access Time - 150 ns
 - Cycle Time - 275 ns
- Fixed Disk and Diskette Drive Adapter
- System Clock/Calendar/Configuration with CMOS RAM and Battery Backup
- Directionally-Mounted Speaker
- Security Keylock/Indicator Assembly
- Bi-Directional Keyboard Interface
- IBM Personal Computer Enhanced Keyboard (Model 339)
- Power-On Indicator (Green)
- Eight Expansion Slots
- 24-Bit Address
- 16-Bit Data Path
- 7-Channel Direct Memory Access (DMA)
- 16-Level Interrupt
- Three Programmable Timers
- 192 Watt Switchable Worldwide Power Supply

- 80287 Math Coprocessor Socket

Prerequisites: The 5170 Personal Computer AT Models 319 and 339 require a video display adapter device for display output 5170 Personal Computer DOS users require DOS 3.1 or later. IBM Personal Computer XENIX® Operating System users require XENIX Version 2.0.

* XENIX is a trademark of Microsoft, Inc.

Compatibility: The 5170 Personal Computer AT model 319 and 339 may be used in situations where the 5170 Personal Computer AT Models 068, 099 and 239 are currently utilized. Most software and hardware currently supported by Models 068, 099 and 239 will continue to be supported by Model 319 and 339.

Numerous software products have been tested for compatibility on 5170 Personal Computer AT Model 319 and 339 with DOS 3.1 and 3.2, and determined to operate substantially as described in their program documentation.

Customer Setup: The customer is responsible for unpacking and installing system components and options for the 5170 Personal Computer AT Models 319 and 339, per the installation instructions provided.

The keyboard is plugged directly into the system unit. The display and printer are connected via adapters installed in the system expansion slots. Once turned on, the system unit automatically runs a power-on self-test to verify system readiness. If a failure is found, an instruction will appear on the screen.

If the test is successfully completed, the system attempts to load an operating system (such as DOS) from the first diskette drive. Should an operating system not be found, the system attempts to load from the first fixed disk. If this operation is not completed, the BASIC interpreter is made ready, identified on the screen, and the system is available for use.

HIGHLIGHTS

- Performance faster than current members of the 5170 Personal Computer AT family.
- Based on high-performance Intel 80286 micro-processor, compatible with most 5170 Personal Computer AT family.
- Includes a 1.2Mb high-capacity diskette drive.
- Allows usage of 20Mb or 30Mb fixed disk drives.
- Contains a standard combination fixed disk and diskette adapter.
- Provides 512Kb memory capacity on the system board.
- Offers a combination serial (asynchronous)/parallel (printer) adapter.
- Contains eight expansion slots: six support 16-bit or 8-bit option cards, two support 8-bit option cards only.
- Enhanced 101-key keyboard with a nine-foot coil cable on Model 339.
- Includes a clock/calendar with battery backup.
- Provides security capability with a standard keylock.
- A diskette program entitled "Exploring the 5170 Personal Computer AT".

Standard Features: The 5170 Personal Computer AT includes the following standard features:

Advanced High-Performance Intel 80286 Microprocessor at 8 MHz

ROM Based Automatic Power-On Self-Test on System Components

ROM Based BASIC Language Interpreter

8088 Compatible Real Address Mode

Protected Virtual Address Mode

512Kb of Memory

1.2Mb High-Capacity Diskette Drive

30Mb Fixed Disk Drive

Fixed Disk and Diskette Drive Adapter

Fixed disk-in-use indicator light (Red)

Serial (Asynchronous)/Parallel (Printer) Adapter (Models 319 and 339)

System Clock/Calendar/System Configuration Storage with Battery Backup

Sound System

Keylock

Bi-Directional Keyboard Interface

Enhanced 101-Key Keyboard Model 339

Switchable Worldwide Power Supply

Power-On Indicator Light (Green)

Eight Expansion Slots

Socket for 80287 Math Coprocessor

24-Bit Addressing

16-Bit Data Path

7-Channel Direct Memory Access (DMA)

16-Level Interrupt

Three Programmable Timers

Description: These models of the 5170 Personal Computer AT provides exceptional performance for professional applications, office environments, including IBM network server functions and personal productivity.

The system unit in Models 319 and 339 includes 512Kb of planar memory, a single 1.2Mb high-capacity diskette drive and a combination fixed disk and diskette drive adapter, a serial/parallel adapter and a 30Mb fixed disk drive.

All models of the 5170 may be further expanded to 640Kb with the 128/640Kb memory option or up to 10.5Mb with multiple 512Kb/2Mb memory options.

Additional direct access storage is available with a 20Mb fixed disk drive, a 30Mb fixed disk drive, a second high-capacity 1.2Mb diskette drive and a dual-sided (320/360Kb) diskette drive. A maximum of two diskette drives and one fixed disk drive, or one diskette drive and two fixed disk drives can be attached to the system unit. These combinations result in a maximum direct access storage capacity of up to 61.2Mb.

The 5170 contains eight expansion slots that support option cards for additional services, features or memory. Six of the slots support either the advanced 16-bit or 8-bit option cards. Two support 8-bit option cards only. However, Models 319 and 339 use one 16-bit slot for the standard combination fixed disk and diskette drive adapter and one 8-bit slot for the serial/parallel adapter. The result is six available expansion slots.

The 5170 Enhanced Personal Computer Keyboard (standard on Model 339) can be divided into five sections:

1. Typing Section
2. Numeric Pad
3. Cursor/Screen Controls
4. Function Keys
5. Indicator Lights

The U.S. keyboard is arranged similar to the Selectric keyboard layout but with 47 graphic character keys. The tab, capslock, shift, enter and backspace keys have a larger striking area and are located in the familiar Selectric locations. One control (CTRL) and one alternate (ALT) key is placed on each side of the space bar. The typing section and the numeric pad have home row identifiers for the touch typist.

The typing section for the non-U.S. keyboard has a layout which meets the International Standards Organization (ISO) standard. It has 48 graphic character keys and a vertical enter key. An alternate graphic (ALTGR) key on the right side of the space bar provides the ability to assign additional graphic characters to the keys.

The cursor and screen control keys have been separated from the numeric pad and therefore, the numeric pad can be dedicated to numeric input. A division sign key has been added to the numeric pad, as well as an additional enter key. Like the current IBM Personal Computer keyboards, the numeric pad may also be used for cursor and screen control when not in numlock mode.

The cursor control keys are arranged in the inverted "T" arrangement. Insert, delete, home, end, page up and page down keys are separated from the numeric pad and located above the dedicated cursor control keys.

The function keys are located across the top of the keyboard. The escape key (ESC) is isolated at the upper left of the keyboard. Two additional function keys are provided (F11 and F12). The function keys are spaced in groups of four. Dedicated Print Screen/SysRq, Scroll Lock and Pause/Break keys are provided for commonly-used functions.

Three indicator lights are located at the upper right of the keyboard. These lights indicate the Numlock, Capslock and Scroll Lock status of the keyboard.

A microprocessor in the keyboard handles the system unit interface protocol, scan code generation and command processing.

Exploring the 5170 Personal Computer AT, a program on a diskette, is supplied with the 5170. It will familiarize a new computer user with the 5170. The program takes 1-1/2 to 2-1/2 hours to complete. There are two versions of the program: monochrome and color. The program is self-loading from the diskette. It contains tutorial information on the keyboard, printer and disk storage, as well as DOS and text editing.

Environmental Considerations:

- Dimensions:
 - Width - 540mm (21.25 in.)
 - Depth - 439mm (17.28 in.)
 - Height - 162mm (6.38 in.)
 - Weight - 19.5Kg (43.0 lbs.)
- Electrical:
 - 90-137V, 50-60 Hz
 - 180-259V, 50-60 Hz
- Ambient Air Temperature:
 - System On - 15.6 - 32.2 degrees C (60 - 90 degrees F)
 - System Off - 10 - 42 degrees C (50 - 110 degrees F)
- Humidity
 - System On - 8 - 80 percent
 - System Off - 20 - 80 percent
 - BTU Output: 1229 BTU/HR
 - Noise Level: Class 3 (Office Environment)

Publications: The following publication will be included with each system unit shipped:

- 5170 PC AT Guide to Operations (6280102)

Additional publications available for purchase:

- Technical Reference - The Technical Reference Manual is for programmers, engineers, and others who want to understand the 5170 Personal Computer AT in greater detail. This reference manual includes functional specifications, BIOS listings, hardware specifications and printouts for peripheral connectors.
 - Technical Reference Manual (TRM) (6280070) S229-9611
 - TRM update (6280099) S229-9608
- Technical Reference Options and Adapters - The Technical Reference Options and Adapters Manual includes function specifications for programmers, engineers, and others who want to understand 5170 Personal Computer options and adapters in greater detail.
 - Technical Reference Options/Adapters (TRO/A) (6322509 - #2509) S229-9612
 - TRO/A 128/640Kb Memory Expansion Update (1502544-#3544) SS34-0017
 - TRO/A 512Kb/2Mb Memory Expansion Update (6183075 - #3075) SS34-0018
- Hardware Maintenance Service and Hardware Maintenance Reference - This publication for service personnel details many aspects of troubleshooting the machine. It includes instructions for identifying the failure of a replaceable unit and a parts catalog. It also includes the Advanced Diagnostic Diskette.
 - Hardware Maintenance Service (HMS) (6280087 - #3087) S229-9603
 - HMS Update (6280139 - # 3100) SS34-0001
 - Hardware Maintenance Reference (HMR) (6280088 - #3088) S229-9604
 - HMR Update (6280138 - #3110) SS34-0002
- BASIC Reference Manual (6280075 - #0075)
- Keyboard Templates (3) (6279940)

SPECIFY (NONE)

SPECIAL FEATURES

20Mb Fixed Disk Drive (P/N 6450205): One additional 20Mb fixed disk drive may be installed in Models 319 and 339. Space and power are provided in the system unit for this drive(s). All fixed disk or diskettes drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. Increased performance of 40 ms average access time is possible from the quasi-closed loop servo positioning system utilized in the drive. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit.

High-Capacity Diskette Drive (P/N 6450206): This is a half-high, 5-1/4-inch, dual-sided drive with 1.2Mb storage capacity. Space and power have been provided in the system unit for up to two drives. The drive is fully self-contained and consists of a spindle drive system, a read positioning system and a read/write/erase system. One of these drives is standard in all models. An optional second drive may be installed in the system unit directly under the first if the space is not occupied by another disk or diskette drive. Both drives uses the standard fixed disk and diskette drive adapter in the system unit.

The drive uses the new 96-TPI, high density media. In addition, it will read or write 48-TPI, single or dual-sided media written for the IBM PCjr, Personal Computer, Personal Computer XT, and IBM Portable Personal Computer, giving a high level of compatibility with existing applications. However, once the 48-TPI media has

been written in this drive, it may only be readable on a high-capacity diskette drive.

Dual-Sided Diskette Drive (P/N 6450207): This diskette drive permits the exchange of 320/360Kb diskette media between the Personal Computer AT, to the 5170 Personal Computer, the Personal Computer XT, the IBM Portable Personal Computer and the IBM PCjr. It is a half-high, 5-1/4 inch, dual-sided drive with a 320/360Kb storage capacity. Space and power for one drive have been provided in the system unit. The drive is fully self-contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system.

The drive is available for all 5170 models. It is installed in the system unit directly under the standard high capacity diskette drive if the space is not occupied by another fixed disk or diskette drive. This drive uses the standard fixed disk and diskette drive adapter in the system unit.

30Mb Fixed Drive (P/N 6450210): One 30Mb Fixed Disk Drive (#0210) may be installed in the 5170 Models 319 and 339 as a second fixed disk drive, providing a maximum of 60Mb of fixed disk storage capacity. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit. Space and power are provided in the system unit for this drive. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. The drive is designed with a dedicated landing zone for the read/write heads to protect the file and its contents during shipping, movement, or storage.

Personal Computer AT Math Co-Processor (P/N 6450211): This option is a high-performance numeric 80287 processor extension with floating point, extended integer, and BCD data types, compatible with the Intel 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Only one 80287 can be installed in a system unit.

PC Network Adapter (P/N 6450213): This option allows the 5170 to be connected to an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, it supports peer-to-peer communications among PCs in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at 2 million bits per second. Each PC on the network requires the PC Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the PC in which the adapter is installed. The Network Adapter contains an Intel 80188 processor, and Intel 82586 network controller, a fixed-frequency modem, and network microcode that off loads the network control and interface functions from the system micro-processor. The fixed-frequency modem operates at a 50.75 MHz transmit frequency and a 219 MHz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network adapter is provided with a 9-foot cable for attaching the PC to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the PC with the Network Adapter to be located up to 1,000 feet from the 5178 Unit. Each user who is to share an application program on a PC Network must be licensed to use that program.

Personal Computer AT Serial/Parallel Adapter (P/N 6450215): This option provides a serial port and a parallel port. It occupies only one expansion slot of either type. The serial portion is fully programmable and supports asynchronous communications from 50 to 9600 bps. The back of the adapter has a 9-pin D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (P/N 6450217) or 10-inch Serial Adapter Connector (P/N 6450242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight bits of parallel data. The

parallel port is provided by a 25-pin, D-shell connector. One or two Serial/Parallel Adapters may be installed in all models. Note: This adapter does not support current loop operation. The 5218 Printer is not supported.

Serial Adapter Cable (P/N 6450217): This is a 3m (10 ft) cable with a 25 pin D-shell connector providing all the signals of an EIA RS-232-C interface which can connect the Serial Adapter port to an appropriate serial device.

Floor Standing Enclosure (P/N 6450218): This optional enclosure is available to customers who desire to remove their system unit from the work surface. With the system unit mounted vertically in the floor standing enclosure, only the essential parts of the system such as the display and keyboard need to be on the work surface. The unit may be positioned left or right of the workspace or under the workspace.

Prototype Adapter (P/N 6450220): This adapter is 4.8 in. high by 13.12 in. long and plugs into any system unit expansion slot except 1 or 7. Two-card edge tabs, one 2 by 31 positions and one 2 by 18 positions, provide all system control signals and voltages. No components are shipped with this card. The adapter contains a voltage bus (+5V DC) and a ground bus (OV DC). Each bus borders the adapter with the ground bus on the component side and the voltage bus on the pin side. A system interface (wiring only) is also provided with a space for a jumper to specify whether the device has an 8 or 16-bit data bus. This adapter also accommodates a D-shell connector from 9 to 37 positions. A recommended system interface logic diagram is available along with a list of recommended components to be used to interface custom logic to the 5170. Up to five Prototype Adapters can be installed in a system unit. Each requires a 16-bit expansion slot.

PC Network Expander (P/N 6450230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to eight Short Distance Kits, Medium Distance Kits, and/or Long Distance Kits in any combination to further extend the distance between the PC with the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

PC Network Short Distance Kit (P/N 6450231): Provides one-foot of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used.

PC Network Medium Distance Kit (P/N 6450232): Provides 400-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when issued in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used.

PC Network Long Distance Kit (P/N 6450233): Provides 800-feet of cable to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight PC Network Distance Kits may be used.

PC Network Cabling Segments:

- PC Network 25-Foot Cabling Segment (P/N 6450234)
- PC Network 50-Foot Cabling Segment (P/N 645-235)
- PC Network 100-Foot Cabling Segment (P/N 6450236)
- PC Network 200-Foot Cabling Segment (P/N 6450237)

Provides four different cable length segments to attach a PC with a PC Network Adapter to the PC Network Base Expander (P/N 6450230) in order to extend the distance between the PC and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight PC Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

Serial Adapter Connector (P/N 6450242): This adapter is a 10-inch cable with a 25 pin D-shell connector providing all the signals for an

EIA RS-232 interface for connecting the Serial Adapter port to an appropriate serial device which has its own cable.

Enhanced Graphics Adapter (#1200)(P/N 1501200): Provides a 9-pin connector on the end of the card for a display that presents a direct-drive RGB (Red, Green and Blue) signal. This Adapter contains 64Kb of graphics memory. It supports four colors at a resolution of 640 pels x 350 pels, an 8 x 14 character box for color text, and 256-characters in text mode. A character generator can be loaded from RAM to allow any set of 256-characters to be used. One light pen can be attached to this adapter in addition to one display via the P-2 connector (6-pin Berg strip on the side of the card). This adapter provides support for one of the following: 5154 Enhanced Color Display, 5151 Monochrome Display, 5153 Color Display or another direct-drive display. Two modes are supported by the Enhanced Graphics Adapter - the enhanced mode which is required for the 5154 Display if its 640 x 350 resolution and selection from up to 64 colors are to be used, and the enhanced display emulation mode which supports the 5151, 5153 and 5154 displays and all the modes provided by the Monochrome Display and Printer Adapter (plus the addition of an all-points-addressable graphics mode for the 5151 Display that is not provided by the Monochrome Display and Printer Adapter) and the Color/Graphics Adapter (plus certain graphic support for the 5153 Display in 320 x 200 resolution and 16 colors for 80 columns in 640 x 200 resolution). Composite video support for attaching analog monitors or TV sets is not provided. A light pen is not supported when the Enhanced Graphics Adapter is used with the 5151 Display.

Enhanced Graphics Adapter Memory Expansion Card (#1201)(P/N 1501201): Provides 64Kb of graphics memory for a total of 128Kb on the Enhanced Graphics Adapter to support up to 16 colors at the 640 x 350 resolution and up to 512 text characters.

Enhanced Graphics Adapter Memory Module Kit (#1203)(P/N 1501203): Provides 128Kb of graphics memory for a total of 256Kb on the Enhanced Graphics Adapter (#1200) with the Graphics Memory Expansion Card (#1201) to support up to 1,024-characters (up to eight 128-character sets), character box sizes up to 8 x 32, and/or other functions such as smooth scrolling, panning (scanning sequentially through graphics memory) and additional pages (screens) of graphics data.

AT Binary Synchronous Communications Adapter (P/N 1501204): The BSC Adapter provides an EIA RS-232-C interface. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter is installed.

AT SDLC Communications Adapter (P/N 6501205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only one SDLC Adapter may be installed.

Cluster Adapter (P/N 1501206): Permits the 5170 to be included in a Cluster of interconnected personal computers which can include the IBM PCjr, the 5150, 5155, 5160, 5170, XT/370, AT/370 and 5531 Industrial PC. The Clustered IBM Personal Computer configuration utilizes baseband signaling and carrier sense multiple access with collision avoidance (CSMA/CA) access protocol. The topology of the interconnection is a bus environment using 75-ohm coaxial cable. The data transmission is 375Kb per second. The Cluster Program is provided to support up to 64 PCs in a clustered configuration. This program permits small work groups in schools and businesses to exchange messages and data files and optionally to share a fixed disk that contains programs. Messages can be broadcast from one PC to all other PCs in the cluster. When a fixed disk is to be shared, the PC in the Cluster with the fixed disk must be designated as a disk server. When a disk server PC is defined, a download option is made available which will permit downloading DOS, the cluster program, and an application program from the disk server PC to a remote PC in the cluster when the remote computer is powered on. Limitations: Each user who is to share an application program on a cluster must be licensed to use that program. Prerequisites: An available slot in the 5170 unit; DOS Version 3.0 or later. If the 5170 is designated as the disk server computer, it must have 256Kb of memory and one fixed disk. The cluster program requires a maximum of 29Kb of resident memory except when the PC is utilized as a disk server, a maximum of 136Kb of memory is required. DOS requirements must be added to the cluster pro-

gram size to determine the memory available for application programs. Maximum: One.

Cluster Cable Kit (P/N 1501207): This kit is used to interconnect the first two PCs in an IBM PC Cluster and attaches to the Cluster Adapter (P/N 1501206). Each PC in the cluster after the first two also requires a cluster cable kit. The Cluster Cable Kit provides a main coaxial cable bus of approximately 32 feet, two cable drops approximately 9 feet each for attachment to the main coaxial cable and to the BNC connectors of a cluster adapter, two BNC T-connectors for attaching the cable drops to the main coaxial cable and two terminating plugs. Maximum: One.

(Except LAD > IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <

(Except LAD > IBM PC Network Adapter II supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD > A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL). <
- (Except LAD > National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD > Specified Operating Environment

- Machine requirements

IBM PC Network Adapter II requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

(Except LAD > IBM PC Network Baseband Adapter (#1221, P/N 1501): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to eight workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to ten daisy chains with eight workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <

(Except LAD > IBM PC Network Baseband Adapter supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD > A feature card for IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.
- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than eight nodes. <
- (Except LAD > National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD > Specified Operating Environment

- Machine Requirements

IBM PC Network Baseband Adapter requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <

Game Control Adapter: Provides support for two customer-supplied joysticks for video game interaction, allowing the user to move an object on the screen in any direction, or it supports up to four customer-supplied game "paddles" for simple horizontal or vertical movement. Prerequisites: An available feature slot. Maximum: One.

Professional Graphics Controller (P/N 6451501): Is required to attach the 5175 Professional Graphics Display to a 5170. The 5175 Display together with the Professional Graphics Controller offers more colors and a higher resolution than the 5154 Enhanced Color Display with the Enhanced Graphics Adapter and provides high-quality color graphics capabilities for a wide range of specialized applications. The Professional Graphics Controller provides two modes: expanded graphics for full support of the 5175 Professional Display and Color/Graphics Monitor Adapter emulation. It offers 640 x 480 resolution for expanded graphics mode and 640 x 400 for emulation mode as well as 256 colors from a palette of 4,096 for expanded graphics mode. There is built into the Controller two-dimensional and three-dimensional capability for drawing, rotating, translating and scaling. An Intel 8 MHz 8088 microprocessor

is provided for high-performance graphics operations and the Controller provides 320Kb of display storage. Additionally, the Controller has 64Kb of graphics microcode that reduces the need to load software routines to support key graphics activities. Limitations: When the Professional Graphics Controller is installed together with the Color/Graphics Monitor Adapter, the Professional Graphics Controller must operate in expanded graphics mode. Prerequisites: Two adjacent slots in the 5170. Maximum: One.

Data Acquisition and Control Adapter (P/N 6451501): Provides analog input/output channels and digital input/output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis and quality control testing in laboratory, pilot plant or full-scale production lines. The adapter provides four analog input channels with throughput to memory at 15,000 conversions per second, two analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of operation for analog input/output channels and programmed I/O mode for digital input/output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Prerequisites: An available slot in the 5170 unit for each adapter desired. Maximum: Four.

General Purpose Interface Bus Adapter (P/N 6451503): Provides an interface between an IBM Personal Computer and the IEEE-438 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300K bits/sec. and programmed I/O data rate of up to 10K bits/sec. It allows the user to select interrupt level and memory access channels. Prerequisites: An available slot in the 5170 unit for each adapter desired. Maximum: Four.

Data Acquisition and Control Adapter Distribution Panel (P/N 6451504): Provides easy access to the I/O signals, voltages and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34 inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with four barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change or remove instruments and/or control points being used. Prerequisites: An Acquisition and Control Adapter for each panel desired. Maximum: Four.

Communications Adapter Cable (P/N 1502067): The Communications Adapter Cable feature supports the attachment of a modem to the BSC adapter or SDLC adapter card connector at the rear of the 5170. The cable is double-shielded and approximately 3m (10 ft.) long. A wrap connector is provided to test the cable. This cable is required to connect the BSC or SDLC adapter to an external modem or other data communications equipment.

3278/79 Emulation Adapter (P/N 1602507): Expands the capabilities of the 5170 by providing coaxial cable connection to the 3274 Control Unit, or 4321, 4331 or 4361 Processor Display Printer Adapter, or the 4361 Workstation Adapter or the 4701 Finance Communication Controller or the 9370 Workstation Adapter. When used with the IBM VM/PC 1.1 or VM/PC 2.0 and VM/PC Host Server the AT/370 can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A and can also support file transfer with the host. Prerequisites: 1) Personal Computer AT (5170) with AT/370 Option Kit (P/N 6236115) -- 2) An available 5170 slot (#6 recommended) -- 3) A customer-supplied coaxial cable, maximum length 1,500m (4970 ft.), is required if the 3278/79 Emulation Adapter is to be used. Specify code #9843 on the 4321 or 4331 if attached to these processors via the Display/Printer Adapter. Specify code #6020 on the 9370 if attached to these processors via the Workstation Adapter. Device Cluster Adapter (#3101) on the 4701 if attached to the unit -- 4) Coaxial Balun Assembly (8642546) is required to attach the AT/370 to the IBM Cabling System via a 3278/79 Emulation Adapter (#2507) in the AT/370. Refer to the "IBM

Cabling System Planning and Installation Guide", GA27-3361, for other considerations such as distance limitations -- 5) Software such as VM/PC 1.1 or VM/PC 2.0 and VM/PC Host Server 3278/79 Host Emulation Sessions or file transfer with VM/SP hosts -- 6) Software such as the TSO Host Server for PC/370 (5789-DTL) for file transfers with MVS systems. Limitations: File transfer is not supported when attached to the 4701, except for AT/370. If VM/PC data transfer with a host is required when using VM/PC 2.0, then the VM/PC Host Server is required. Maximum: One.

Enhanced Display Station Emulation Adapter (#2871): Permits a 5170 to be connected to a S/34, S/36, or S/38 directly; remotely via the 5251 Display Station Model 12; or remotely via the 5294 Remote Control Unit to emulate a 5250 workstation. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 5170 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 5170 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. One or two host sessions and one personal computer session can be active concurrently. Field Installation: Yes. Prerequisites: An available full-feature slot in the 5170 unit. Maximum: One. Customer Setup: Yes.

5253 Emulation Installation Convenience Kit Version 3 (#2896): This kit provides the items necessary to permit the attachment of the 5170 to the 5520 Administrative System and support 5253 emulation. Maximum: One.

5170 Personal Computer AT S/370 Channel Emulator (#3200): The S/370 Channel Emulator is an adapter card for the IBM PC AT system which emulates the operation of an IBM System/370 channel. The card may be used with appropriate application software to channel attach certain S/370 devices to the PC AT. Prerequisites: None. Customer Setup: Customer is responsible for Installation and Setup.

Highlights

- Single card for insertion in an IBM PC AT system unit
- 32K of on-card high speed memory
- Hardware support for Initial Selection and Data Transfer 370 channel sequences
- Read/write record size of up to 32K bytes
- Interlocked and data streaming interfaces may be emulated
- Byte, block or selector channel protocol may be emulated
- Support warranted for connection to the following 370 devices:
 - IBM 3820 Page Printer

Description

This adapter, when coupled with appropriate software, may be used to channel attach certain S/370 peripherals to the IBM PC AT.

The feature consists of a piggyback card which occupies a single slot and provides a D-shell connector to an interface cable. The interface cable is fitted with 370 BUS and TAG serpentine channel connectors for connection to the 370 peripheral.

The diagnostics may be used to check the operation of the card. The diagnostics require DOS V2.1 or later.

With appropriate software, a S/370 byte, block or selector channel may be emulated. Both the DC interlocked and data streaming protocols are supported.

Under software control, hardware assistance is available for the Initial Selection and Data Transfer channel sequences. An on-card buffer of 32k is used for the hardware data transfer sequence.

Publications: S/370 Channel Emulator Technical Library. This manual consists of:

- Guide to Operations
- Hardware Maintenance Guide
- Technical Reference

- Diagnostic diskette

Specify: The following components are included as part of feature #3200 or can be ordered separately.

- Card Assembly (P/N 70X5061)
- Cable (10 ft.) (P/N 70X4865)
- S/370 Channel Emulator Technical Library (P/N 6476158)

128/640Kb Memory Expansion Option (P/N 6450338): This feature provides 128Kb of base memory, thus allowing those users requiring the support of 640Kb base memory to satisfy their requirements.

With the addition of the 512Kb Memory Module Kit (P/N 6450339), this card can have a maximum memory of 640Kb.

When this option is installed fully populated (640Kb), the user will have available 1.152Mb of system memory.

512Kb Memory Module Kit (P/N 6450339): This feature provides an additional 512Kb memory on either the 128/640Kb or the 512Kb/2Mb Memory Expansion Options.

512Kb/2Mb Memory Expansion Option (P/N 6450343): This feature comes with 512Kb of memory on the card. With additional 512Kb Memory Module Kits (P/N 6450339), this card can be expanded up to 2Mb of system unit memory (the base card plus Memory Module Kits).

A maximum of five 512Kb/2Mb Memory Expansion Options can be installed in the system unit. A total of 10.5Mb of user memory is possible, with 512Kb of planar memory plus 10Mb of memory options (five cards times 2Mb/card).

Token-Ring Network PC Adapter: (P/N 6339100) The IBM Token-Ring PC Adapter is a feature card for the IBM Personal Computer. The adapter contains a microprocessor operating under control of adapter resident microcode. The adapter transmits and receives at a speed of 4 million bits per second using protocols conforming IEEE 802.5 and ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard. Diagnostics invoked during adapter initialization verify the adapter operation and check-out the cabling to the access unit. The adapter detects permanent errors, such as loss of receive signal, and generates a notification signal to initiate automatic network recovery. Recoverable errors, such as bit errors in the transmitted message, are detected by the adapter for subsequent reporting to a ring diagnostic program. A diskette is included with the adapter, and supports the operation and testing of the adapter and network. The adapter handler program provides a programming interface for the adapter. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as an aid in problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented. A supplement to the IBM Personal Computer Guide to Operations is included with the adapter. It contains installation instructions for the adapter and adapter support programs. Prerequisites: A customer supplied attachment cable is required for connecting the adapter to the network cabling system.

Memory Expansion Adapter (P/N 55X3560): A versatile multifunction adapter providing up to 3Mb of memory, split memory addressing, a parallel printer port and an asynchronous serial communications port. The adapter is provided with 512Kb of memory installed. Memory Module Kits can be added in increments of 512Kb up to maximum of 3Mb per adapter. A maximum of five adapters may be installed providing up to 15Mb of additional memory. Split memory addressing allows the base memory to be filled up to the 640Kb limit. Additional memory automatically becomes part of the expansion memory area. The asynchronous serial communications port is an RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. The parallel printer port provides a 25-pin connector to attach a parallel printer. Limitations: The 5170 can support a maximum of two serial ports and two parallel ports. Maximum: Five adapters. Field Installation: Yes. Prerequisite: One 16 bit expansion slot per adapter. Customer Setup: Yes.

Memory Module Kit (P/N 55X3547): Expands the memory capacity of the Memory Expansion Adapter (P/N 55X3560) in increments of

512Kb up to a maximum of 3Mb per adapter. (512Kb is provided with the Adapter.) Each kit consists of two memory modules (256K each) which must be inserted into memory module sockets on the adapter card. A fully populated Memory Expansion Adapter would consist of five Memory Module Kits and provide 3Mb of memory. Limitations: Five per adapter card. Field Installation: Yes. Prerequisite: Memory Expansion Adapter (P/N 55X3560). Customer Setup: Yes.

Memory Expansion Adapter (P/N 55X3679): A versatile multifunction adapter providing up to 6Mb of memory, split memory addressing, a parallel printer port and an asynchronous serial communications port. The adapter is provided with 1Mb of memory installed. Memory Module Kits can be added in increments of 1Mb up to a maximum of 6Mb per adapter. Three adapters may be installed providing a maximum of 16Mb of additional memory. Split memory addressing allows the base memory to be filled up to the 640Kb limit. Additional memory automatically becomes part of the expansion memory area. The asynchronous serial communications port is an RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. The parallel printer port provides a 25-pin connector to attach a parallel printer. Limitations: The 5170 and 5162 can support a maximum of two serial ports and two parallel ports. Maximum: Three adapters and 16Mb of memory. Field Installation: Yes. Prerequisites: One 16-bit expansion slot per adapter. Customer Setup: Yes.

Memory Module Kit (P/N 55X3681): Expands the memory capacity of the Memory Expansion Adapter (P/N 55X3560 or P/N 55X3679) in increments of 1Mb up to a maximum of 6Mb per adapter (1Mb is provided with the adapter.) Each kit consists of two memory modules (512Kb each) which must be inserted into memory module sockets on the adapter card. A fully populated Memory Expansion Adapter would consist of five Memory Module Kits and provide 6Mb of memory. Limitations: The 1Mb Memory Module Kit (P/N 55X3681) can be used only with IBM Memory Expansion Adapters (P/N 55X3560 and P/N 55X3679). This 1Mb Memory Module Kit (P/N 55X3547) can only be combined with the 512Kb Memory Module Kit (P/N 55X3547) in a specific configuration.

2Mb Expanded Memory Adapter (#3905, P/N 2685193): Provides 2Mb of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30. The 2Mb Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICRO-SOFT.

The 2Mb Expanded Memory Adapter may be installed in any full length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT or Personal System/2 Model 30. However, a double socketed (16-bit) bus slot is recommended for the Personal Computer AT and 3270 Personal Computer AT to enable the 2Mb Expanded Memory Adapter to achieve optimum performance.

The 2Mb Expanded Memory Adapter will backfill conventional memory from the 256Kb address to the 640Kb address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to two PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2Mb Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16Kb increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2Mb) through four 16Kb pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: One 2Mb Expanded Memory Adapter. Field Installation: Yes.

Personal System/2 Display Adapter (#4050, 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the

IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of one of the following displays: 8503, 8512, 8513 and 8514.

Monochrome Display and Printer Adapter (P/N 1504900): Provides for the attachment of the 5151 Monochrome Display Model 001 and one of the supported printers, 4201 Proprietary Model 001, 3852 Color Jetprinter Model 002, 5201 QUIETWRITER Printer, 5216 Wheelprinter Model 002 or any compatible printer. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5170. Limitations: The primary monitor/display adapter must be installed in the 5160 System Unit and not in a 5161 Expansion Unit. Maximum: One.

Color/Graphics Monitor Adapter (P/N 1504910): Provides for the attachment of a color display to the 5170. Either a "direct-drive" signal or a "composite" video signal can be selected.

The display can be a direct-drive 5153 Color Display Model 001, a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16 foreground and eight background colors are supported in text (character) mode. This attachment also provides support for 4-color medium resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 x 200). 256 characters are available in "text" mode, 128 in medium- or high-resolution graphics. The adapter provides 16Kb of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Limitations: The primary monitor/display adapter must be installed in the 5170 System Unit and not in a 5161 Expansion Unit. Prerequisites: An available full-feature system expansion slot. Maximum: One.

High Speed Adapter (#4920): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner to the 5170 Personal Computer AT. This adapter is installed into full-size expansion slot of 5170 Personal Computer AT system unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS-422-A driver and Receiver. The adapter is designed to the EIA RS-422-A electrical interface and provides one 25-pin "D" shell, mail type connector. Maximum: One. Cable: Communication Adapter Cable (P/N 1502067) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Publication: "Guide to Operations" (6456788). Specify: "Guide to Operations" as follows:

Form Number	Language
GA18-2476	English US
GA09-0378	Canadian French

Publications: Available at a fee for the IBM Personal Computer High Speed Adapter are: "High Speed Adapter Guide to Operations"

Item #	Form #	Language
6456785	GA10-0125	Spanish
6456786	GA09-0378	Canadian French

"High Speed Adapter Hardware Maintenance and Service"

Item #	Form #	Language
6455787	SY18-2167	English US

"High Speed Adapter Technical Reference"

Item #	Form #	Language
6455771	SC18-2117	English US

3117 Adapter (#4925): Allows connection of the 3117 Scanner to the 5170 Personal Computer AT. This adapter is installed into full-size

expansion slot of the 5170 system unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005) is required. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot is required. Customer Setup: Yes. Publication: "Guide to Operations" (6456831). Specify: "Guide To Operations" as follows:

Form Number	Language
GA18-2477	English US
GA09-0375	Canadian French

Publications: Available at a fee for the IBM Personal Computer 3117 Adapter are: "Guide To Operations for the IBM 3117 Scanner and the 3117 Adapter".

Item #	Form #	Language
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"IBM 3117 Scanner Hardware Maintenance and Service"

Item #	Form #	Language
6456833	SY18-2159	English US
65X1748	SY11-1018	French

"IBM 3117 Scanner Technical Reference"

Item #	Form #	Language
6456837	SC18-2105	English US

3278/79 Emulation Adapter (#5050): Expands the capabilities of the 5170 by providing coaxial cable attachment to the 3274 and 3276 Control Unit, the 4321, 4331 or 4361 Processor Display/Printer Adapter, the 4361 Workstation Adapter, or the 4701 Finance Communication Controller or the 9370 Workstation Adapter. When used with the IBM PC 3270 Emulation Program, Entry Level, the 5170 can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A and can support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal Computer DOS Session can be active concurrently and the user can interact with either session alternately. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5170 system unit full feature expansion slot is required. A customer supplied attachment cable is required for host system attachment. Software such as the IBM PC 3270 Emulation Program, Entry Level or other communications software is required. For file transfer, a 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required. For attachment to the 4321 or 4331, specify code #9843 must be installed on the 4321 or 4331. For attachment to the 9370, specify code #6020 must be installed. See 4700 System Descriptions for 4700 attachment prerequisites. Other Usage: Also available on the IBM PC, the IBM PC XT, the XT/370, the AT/370, and the 4700 Personal Computer. See individual system descriptions for capabilities and prerequisites.

(Except LAD > PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD > The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD > Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening

- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
Depth - 336mm (13.26 in.)
Height - 107.95mm (4.25 in.)
Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <

AT/370 Option Kit (P/N 6236115): The AT/370 Option Kit is a set of two 16-bit option cards that allow the IBM Personal Computer AT to execute many of the S/370 instructions. Following is a description of these cards:

- **AT/370 Processor (2684070)** consists of three microprocessors, a page table and attendant circuitry. The first microprocessor engine executes most of the commonly used fixed point S/370 instructions. The second microprocessor emulates the remaining non-floating point S/370 instructions. The third microprocessor executes S/370 floating point instructions.
- **AT/370 512Kb Memory (2684069):** This Auxiliary RAM card contains 512Kb of parity checked RAM accessible from either the AT/370 Processor Card or the Intel 80286 (the microprocessor for the IBM Personal Computer AT). Concurrent requests for memory access are arbitrated, with the 80286 accesses receiving highest priority. 128Kb of this memory is viewed in Personal Computer mode as a contiguous storage area that begins at the end of the 512Kb of required Personal Computer memory in the IBM Personal Computer AT. Therefore, in Personal Computer mode the IBM Personal Computer AT/370 has only 640Kb of usable memory. When in this native mode the memory operates marginally slower than the 512Kb of memory on the systems board. The AT/370 Processor Card views this memory as two separate areas which are not contiguously addressable. The area from 0 to 480Kb is addressed from 0 to 480Kb and is real S/370 space. The area from 480Kb to 512Kb is control store for the second microprocessor on the AT/370 Processor Card.

Prerequisites: 1) Two adjacent 16-bit slots (#4 and #5 recommended) -- 2) Software such as the VM/PC Licensed Programs 1.1 or VM/PC 2.0 and VM/PC Host Server (4650 or 4651) -- 3) 512Kb of memory on Personal Computer AT Systems Board -- 4) An Optional Advanced IBM Personal Computer 3278/79 Emulation Adapter (#5050) may be installed with this AT/370 Kit if host interactive or file transfer sessions are required.

For Page cache support, VM/PC 2.0 only, (512Kb minimum required, 1Mb minimum recommended) the 512/2.0Mb Memory Expansion Options(s) with up to three 512Kb/2Mb Memory Module Kits

APL2 character support, VM/PC 2.0 only, requires Enhanced Graphic Adapter and 5151, 5153 or 5154 display.

The IBM PC Network Program is required if the Network is to be used in the VM/PC 2.0 environment.

VM/PC 1.1:

- Requires PC DOS 3.1, when supporting Models 099, 239 and 319.

VM/PC 2.0, VM/PC Host Server:

- Requires PC DOS 3.1 when supporting Models 099 and 239.

- Requires either PC DOS 3.1 or PC DOS 3.2 when supporting Models 319 or 919.
- Requires PC DOS 3.2 when supporting Models 339 or 939, when supporting Model 339.

Note:

- The Token-Ring Network Adapter is not supported by VM/PC.
- VM/PC 2.0 will support the Model 339 (as an AT/370) enhanced keyboard in At compatibility mode. PF11 and PF12 function keys will be simulated using the PF1 and PF2 keys, respectively, in conjunction with the shift key. The physical PF11 and PF12 keys are not supported by VM/PC 2.0.
- The VM/PC PC DOS Session does not support the new interface to the enhanced keyboard. Users should restrict programs run in this session to those that do not use this new interface. Examples of programs which use this interface are BASIC and BASICA on DOS 3.2.

Maximum: One.

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512Kb of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128Kb Memory, 5.25 inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128Kb Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128Kb memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT

- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128Kb or 512Kb of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.
- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.
- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128Kb or 512Kb of memory, four or eight ports, and will be shipped with either 5.25 inch or 3.5 inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25 inch or 3.5 inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512Kb Memory Expansion (#6242, P/N 00F5529): Replaces the 128Kb of Co-Processor memory with 512Kb of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512Kb.

Realtime Interface Co-Processor Multiport, Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

IBM Enhanced Graphics Adapter (EGA) Jumper Card (P/N 8575146): Provides an external synchronization from the IBM 4055 InfoWindow Display to allow overlay of text and graphics stored on the IBM Personal Computer with video stored on a video disc player. Technical Information: The IBM Enhanced Graphics Adapter Jumper Card attaches to the feature connector of the IBM Enhanced Graphics Adapter and to the IBM General Purpose Interface Bus Adapter (IRQ connector Row B, pins 2-6). Maximum: One. Field Installation: Yes. Prerequisites: IBM Enhanced Graphics Adapter and IBM General Purpose Interface Bus Adapter. Customer Setup: Yes.

Publications: Enhanced Graphics Adapter Jumper Card Guide to Operations (GA27-3744, P/N 8575145). Enhanced Graphics Adapter Jumper Card Hardware (SX27-3756, P/N 8575147)

4683 Model 2 Attachment Adapter Kit (#8314) (P/N 83X7654): The 4683 Model 2 Attachment Adapter Kit provides the necessary adapter card, software, diagnostics, installation aid and instructions for attaching one or two 4683 Model 2 to an IBM Personal Computer AT. The kit consists of the following:

- IBM 4683 Model 2 Adapter Card and Wrap Plug
- Ship group that contains:
 - Lock Accessory Kit
 - Diskette Kit

Publications:

- IBM 4683 Model 2 Attachment Adapter Kit: Installation Guide
- IBM 4683 Model 2 Attachment Adapter Kit: Problem Determination Guide
- IBM 4680 Store System Terminal Operations Guide
- Guide to Operations IBM Personal Computer: 4683 Model 2 Attachment Adapter

The combination of the 4683 Model 2 and Attachment Adapter Kit connected to and installed on the IBM Personal Computer, described in the specified operating environment, provides the capability to attach up to two 4683 Model 2 Point-of-Sale Terminals. The Attachment Kit is applicable to all small store environments where an in-store IBM Personal Computer XT and Application Program are available to meet the requirements. Limitations: Maximum of One Attachment Adapter. Prerequisites: An available full-feature slot in the system unit. Field Installation: Yes. Customer Setup: Yes.

IBM Realtime Interface Co-Processor (P/N 58X7284, P/N 90X6219, P/N 90X6218, P/N 90X6221): The IBM Realtime Interface Co-Processor is an interface subsystem for IBM Industrial Computers and IBM Personal Computers. A Realtime Interface Co-Processor (ARTIC) in conjunction with its software support provides support for attachment of Programmable Controllers in industrial applications.

The IBM Realtime Interface Co-Processor will be available with either 128Kb or 512Kb of standard memory and either 5.25 or 3.5-inch program media.

● Standard Features

- Advanced high-performance Intel(1) 80186 micro-processor
- 128Kb or 512Kb of dual-ported memory with parity for error detection (128Kb expandable to 256Kb, 512Kb expandable to 1024Kb)
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the co-processor storage and its interface ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Two serial I/O ports
- Data rates up to 64K bps full duplex with external clocking on one port, while the second port is operated at 19.2K bps full duplex.
- Transmit and Receive status-indicators
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support
- CRC generation and checking
- Pluggable Interface Boards
- Custom Interface Board support
- Byte-wide I/O Interface available at Interface Board Connector
- All external signals available at Interface Board connector
- Five programmable hardware timers
- Watchdog timer
- Watchdog timer status-indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - ▲ Hardware setup
 - ▲ Software setup

- ▲ Problem determination procedures
- ▲ Customer diagnostics diskette.
- Realtime Control Program microcode
 - ▲ Multi-tasking, preemptive priority
 - ▲ Co-Processor memory management
 - ▲ Timer support
 - ▲ Watchdog timer support
 - ▲ Queue management
 - ▲ Inter-task communications
 - ▲ Initial Program Load.
- ROM-based automatic power-on self-test of Co-processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader
- Optional Features
 - EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001)
 - EIA RS-422-A Interface Board (P/N 70X9002)
 - CCITT V.35 Interface Board (P/N 70X9003)
 - 20ma Current Loop Interface Board (P/N 70X9004)
 - Realtime Interface Co-Processor 128Kb Memory Expansion (P/N 58X7289) (can only be used with features P/N 58X7284 and P/N 90X6218)
 - Realtime Interface Co-Processor 512Kb Memory Expansion (can only be used with features P/N 90X6219 and P/N 90X6221)
 - RS-232-C Direct Attach Interface Cable (P/N 58X7290)
 - RS-232-C Modem Attach Interface Cable (P/N 58X7291)
 - IBM Realtime Interface Co-Processor Technical Reference (P/N 60X8776)
 - ▲ Hardware technical information
 - ▲ Realtime Control Program microcode description
 - ▲ Interface Board design information.
 - IBM Realtime Interface Co-Processor Hardware Maintenance and Service (P/N 58X7292)
 - ▲ Problem determination procedures
 - ▲ Advanced Diagnostics Diskette
 - ▲ Wrap connector
 - CCITT V.35 Interface Cable (P/N 58X7293)

The Realtime Interface Co-Processor has been designed for use in industrial applications of the IBM Industrial Computers and IBM Personal Computers. The Co-Processor is compatible with the 5531, 7531, 7532, 5160, and 5170 computer systems. The 5531 Industrial Computer and 5160 Personal Computer are based on the Intel(1) 8088 microprocessor. The 7531 and 7532 Industrial Computers and 5170 Personal Computer are based on the Intel(1) 80286 microprocessor.

The Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are two independent serial ports that operate at speeds up to 64K bps using direct memory access. One port can operate at 64K bps full duplex, while the second is operated at a maximum of 19.2K bps full duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the Co-Processor is designed to accept two optional interface boards or user developed custom interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20ma Current Loop Interface Board
- CCITT V.35 Interface Board.

A maximum of two Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be

found in the optional "Realtime Interface Co-Processor Technical Reference" (P/N 60X8776).

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit mode on the 5531 and 5160 and in 8-bit or 16-bit mode on the 7531, 7532 and 5170.

The Realtime Interface Co-Processor will be available in two memory capacities, 128Kb and 512Kb, and will be shipped with either 5.25-inch or 3.5-inch program media.

- IBM Realtime Interface Co-Processor with 128Kb of memory and 5.25-inch program media (P/N 58X7284)
- IBM Realtime Interface Co-Processor with 128Kb of memory and 3.5-inch program media (P/N 90X6218)
- IBM Realtime Interface Co-Processor with 512Kb of memory and 5.25-inch program media (P/N 90X6219)
- IBM Realtime Interface Co-Processor with 512Kb of memory and 3.5-inch program media (P/N 90X6221)

All Realtime Interface Co-Processor features are functionally equivalent. Features P/N 58X7284 and P/N 90X6218 are shipped with 128Kb of memory, upgradeable to 256Kb, and features P/N 90X6219 and P/N 90X6221 are shipped with 512Kb of memory, upgradeable to 1024Kb. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128Kb Memory Expansion Option (P/N 58X7289) (Can only be used with features P/N 58X7284 and P/N 90X6218)
- 512Kb Memory Expansion Option (P/N 76X1019) (Can only be used with features P/N 90X6219 and P/N 90X6221)

Detailed technical information on the Realtime Interface Co-Processor is provided in the optional Realtime Interface Co-Processor Technical Reference (P/N 60X8776).

Realtime Control Program

The Realtime Control Program is microcode for the Realtime Interface Co-Processor. It is included with the Co-processor feature and is shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The Realtime Control Program microcode provides a realtime, multi-tasking operational environment for supporting user applications running on the Realtime Interface Co-Processor. The Realtime Control Program microcode is loaded from the system unit memory to the Realtime Interface Co-Processor memory. Once loaded, the Realtime Control Program microcode initializes itself and the Realtime Interface Co-Processor. It then signals the system unit processor that it is loaded and ready.

The Realtime Control Program microcode supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the Realtime Control Program microcode may communicate with another task running under the control program or with an application program running in the system unit.

The Realtime Control Program microcode provides support for interfacing IBM Industrial Computer or Personal Computer applications to the Realtime Control Program microcode and uses the IBM PC Macro Assembler as the program-preparation facility.

The Realtime Control Program microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 256 software timers with increments ranging from 5 ms to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Intertask communications is accomplished by the wait/post mechanism. Data may be passed between tasks by user queues.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Realtime Interface Co-Processor upon failure. It will also switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the Realtime Control Program microcode is provided in the optional Realtime Interface Co-Processor Technical Reference (P/N 60X8776).

The Realtime Interface Co-Processor can coexist with the following IBM Industrial and Personal Computer adapters:

- 64/256Kb Memory Expansion Option (P/N 1501013)
- 128Kb Memory Expansion (P/N 6450209)
- 512Kb Memory Expansion (P/N 6450203)
- PC Network Adapter (P/N 6450213)
- Enhanced Color Graphics Adapter (P/N 1501200)
- Combination Adapter II (P/N 6523466)
- Binary Synchronous Communications Adapter (P/N 1501204)
- SDLC Communications Adapter (P/N 1501205)
- Asynchronous Communications Adapter (P/N 1502074)
- Personal Computer Cluster Adapter (P/N 1501206)
- Data Acquisition and Control Adapter (P/N 6451502)
- General Purpose Interface Bus Adapter (P/N 6451503)
- Color/Graphics Monitor Adapter (P/N 1504910)
- Serial/Parallel Adapter (P/N 6450215)
- 10Mb Fixed Disk Drive/Adapter Kit (P/N 6523704)
- Printer Adapter (P/N 1505200)
- Monochrome Display and Printer Adapter (P/N 1504900)
- 3278/79 Emulation Adapter (P/N 1602507)
- XT/370 Option Kit (P/N 1503891)
- Token-Ring Network PC Adapter (P/N 6339100)
- Game Control Adapter (P/N 1501300)
- Enhanced Display Station Emulation Adapter (P/N 6403690)
- 5253 Emulation Installation Convenience kit (#2882)
- 5250 Emulation Convenience Kit (P/N 6403692)
- AT/370 Option Kit (P/N 6236115)
- XT/370 Option Kit (P/N 1602509)

Publications

The Realtime Interface Co-Processor will be shipped with one manual:

- "IBM Realtime Interface Co-Processor Guide to Operations"
The Guide to Operations covers the Realtime Interface Co-Processor and the optional Interface Boards and cables. The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Realtime Interface Co-Processor, optional Interface Boards, and cables. This publication is intended for anyone who will be installing, using, or programming the Realtime Interface Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available from Mechanicsburg.

The following manuals are available for purchase:

- "IBM Realtime Interface Co-Processor Technical Reference" (P/N 60X8776)
The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Also included is detailed technical information on Interface Board design. It describes the interface between the Realtime Interface Co-Processor and the pluggable Interface Board. Detailed information on the programmer interfaces to the Realtime Control Program microcode is included.

The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Realtime Interface Co-Processor, Realtime Control Program microcode, optional Interface Boards and cables.

- "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (P/N 58X7292)

The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Realtime Interface Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and a 15-pin wrap-connector for use when running Co-Processor diagnostics.

Limitations

Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed in the "Compatibility" section of this document are not supported.

The Realtime Interface Co-Processor is not designed to run DOS applications but is intended for industrial applications written to interface with the Realtime Control Program microcode.

In most system configurations, one Realtime Interface Co-Processor can be installed in the 5531 and 5160 computers, and up to three can be installed in the 7531, 7532, and 5170 Computers. For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 80286-based IBM Industrial and Personal computers prohibits an 8-bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a 16-bit adapter (Realtime Interface Co-Processor) within the same region.

See the "IBM Realtime Interface Co-Processor Technical Reference" for complete details.

Prerequisites

The Realtime Interface Co-Processor must be installed in one of the following systems:

- 5531 Industrial Computer
- 7531 Industrial Computer
- 7532 Industrial Computer
- 5160 Personal Computer
- 5170 Personal Computer

Customer Setup (CSU): The Realtime Interface Co-Processor and all options are customer setup (CSU). CSU allowance is one (1) day. Detailed setup instructions are included with each co-processor card. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

Special Features

EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.

EIA RS-422-A Interface Board (P/N 70X9002): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4,000 ft, however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

CCITT V.35 Interface Board (P/N 70X9003): Adapts one of the Co-Processor's serial ports for compatibility with CCITT V.35 interfaces.

20ma Current Loop Interface Board (P/N 70X9004): Adapts one of the Co-Processor's serial ports for compatibility with 20ma interfaces. The current loop Interface Board also has the capability to provide the 20ma current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment.

See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

Realtime Interface Co-Processor 128Kb Memory Expansion (P/N 58X7289): Expands the Realtime Interface Co-Processor (P/N 58X7284 and P/N 90X6218) memory from 128Kb to 256Kb. Only one 128Kb Memory Expansion Option may be installed.

Realtime Interface Co-Processor 512Kb Memory Expansion (P/N 76X1019): Expands the Realtime Interface Co-Processor (P/N 90X6219 and P/N 90X6221) memory from 512Kb to 1024Kb. Only one 512Kb Memory Expansion Option may be installed.

EIA RS-232-C Direct Attach Interface Cable Option (P/N 58X7290): Allows the user to connect one port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001) is installed.

EIA RS-232-C Modem Attach Interface Cable (P/N 58X7291): Allows the user to connect one port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (P/N 70X9001) is installed.

CCITT V.35 Interface Cable (P/N 58X7293): Allows the user to connect one port of the Realtime Interface Co-Processor to a CCITT V.35 modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the CCITT V.35 Interface Board (P/N 70X9003) is installed.

Specified Operating Environment

- Intel(1) 80186 Microprocessor
- 7.37 MHz clock speed
- 20-bit addressing
- 16-bit data path
- 128Kb or 512Kb Dynamic RAM
- 16Kb ROM

Operating Environment

- Electrical

Operating voltages:

- ▲ +5V DC
- ▲ +12V DC
- ▲ -12V DC
- ▲ -5V DC

Current requirements

- ▲ Realtime Interface Co-Processor
 - △ +5V DC at 2.1a
- ▲ RS-232-C/CCITT V.24 Interface Board
 - △ +5V DC at 80ma
 - △ +12V DC at 35ma
 - △ -12V DC at 22ma
- ▲ RS-422-A Interface Board
 - △ +5V DC at 120ma
- ▲ 20ma Current Loop Interface Board
 - △ +5V DC at 35ma
 - △ +12V DC at 52ma
 - △ -12V DC at 45ma

▲ CCITT V.35 Interface Board

- △ +5V DC at 150ma
- △ -5V DC at 70ma
- △ +12V DC at 15ma
- △ -12V DC at 15ma

● FCC Class A

Installation of the Realtime Interface Co-Processor changes the FCC rating of the 5160 and 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. See the "IBM Realtime Interface Co-Processor Guide To Operations" for the FCC Statement.

Hardware Requirements

One of the following IBM system units is required for operation of the Realtime Interface Co-Processor.

- 5531 Industrial Computer Models 011 and 021
- 7531 Industrial Computer Model 041
- 7532 Industrial Computer Model 041
- 5160 Personal Computer Models 087, 068, 078, 267, 268, 277, 278, 088, and 089
- 5170 Personal Computer Models 068, 099, 239, 319, and 339

Software Requirements

The IBM Personal Computer Disk Operating System (DOS), version 2.1, 3.0, 3.1, or 3.2 is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- IBM Realtime Interface Co-Processor Technical Reference (P/N 60X8776)
- Realtime Control Program DOS Support (P/N 67X1250 and P/N 85X2000)
- Realtime Interface Co-Processor C Language Support (P/N 85X2034 and P/N 85X1996)
- Realtime Interface Co-Processor Developer's Kit (P/N 67X1251 and P/N 85X2001)

Enhanced Memory Expansion Adapter (P/N 74X8635, #8635): This multifunction adapter provides up to 12Mb of memory, split memory addressing, a parallel printer port, and an asynchronous serial communications port. The adapter comes with Above Disc to convert extended memory to expanded memory for EMS applications. Memory for the adapter is sold separately. Memory module kits can be added in increments of .5Mb, 1Mb, or 2Mb up to a maximum of 3Mb, 5Mb, 6Mb, or 12Mb per adapter. A maximum of five adapters (4 in an XT-286) may be installed, providing a maximum of 15Mb of additional memory. The split memory addressing feature allows the base memory to be filled up to the 640Kb limit with the remaining adapter memory automatically becoming part of the expansion memory area.

The asynchronous serial communications port is a 9-pin D-shell RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer, or other serial device. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel printer port provides a 25-pin connector to connect a parallel printer.

One 16-bit expansion slot is required for each adapter. Adapters are customer installable. A maximum of two serial and three parallel ports are supported by the 5170. One serial and one parallel port is included in the 5170 models, except the 5170 Model 68.

Adapters can be used to provide up to two serial and two parallel ports.

- One year limited warranty.

Machine requirements: The Enhanced Memory Expansion Adapter can be installed in all models of the IBM Personal Computer AT (5170). One 16-bit expansion slot is required for each adapter. The adapter is sold without memory. Therefore, memory must be purchased separately. The adapter can use the 512Kb Memory Module Kit (#3397) and the 1Mb Memory Module Kit (#3402) as well as the new 2Mb Memory Module Kit (#7833).

The adapter conforms to FCC Class B specifications.

Programming requirements: Use of Above Disc requires DOS 3.0 or higher.

Memory Module Kit (P/N 74X7833, #7833): Expands the memory capacity of the Memory Expansion Adapters (#3395), (#3400), and the Enhanced Memory Expansion Adapter (#8635) in increments of 2Mb up to a maximum of 12Mb per adapter. Each kit consists of two 1,024Kb memory modules which are inserted into memory module sockets on the adapter. A maximum of six kits can be added to each adapter. Kits are customer installable. Installation on Memory Expansion Adapters (#3395) and (#3400) will require removing all currently installed 256Kb and 512Kb memory modules.

- Memory expansion up to 12Mb.
- Split memory addressing.
- Parallel printer port and asynchronous communications port.
- New easy to install 1Mb memory module.
- Supports IBM Operating System/2.
- Supports LIM EMS with Above Disc.

MODEL CONVERSIONS

Available only at time of manufacture.

Accessories for Enhanced Keyboard:

	P/N
Clear Keycaps (60) with Paper Inserts	6341707
Blank Light Keycaps	1351710
Blank Dark Keycaps	1351728
Paper Inserts (300)	6341704
Keycap Removal Tools (6)	1351717

Accessories can be ordered by calling IBM Direct on 1-800-465-1234.

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

5170 IBM SERIES/1 SYSTEM UNITS MDLS 495, 496

PURPOSE

The Series/1 System Unit is an entry level Series/1 product integrated with certain models of the Personal Computer AT. Within the System Unit is a Series/1 microprocessor, a Personal Computer AT microprocessor functioning as an I/O controller, a fixed disk drive, a high-capacity diskette drive, a serial/parallel adapter, a Personal Computer AT Keyboard or a Personal Computer Enhanced Keyboard and a Six-Port Terminal/Host Attachment card with four RS-422 (local) ports and two RS-232-C asynchronous ports.

MODELS

Model 495: (NO LONGER AVAILABLE) System Unit has a Series/1 Microprocessor with a 256K byte Memory integrated with a Personal Computer AT (Model 099) with a 512K byte memory, 20Mb Fixed Disk Drive, Fixed Disk/Diskette Drive Adapter, 1M byte High-Capacity Diskette Drive, Six-Port Terminal/Host Attachment Card, Personal Computer AT Keyboard, and Serial/Parallel Adapter.

Model 496: System Unit has a Series/1 Microprocessor with a 1M byte Memory integrated with a Personal Computer AT (Model 339) with a 512K byte memory, 30Mb Fixed Disk Drive, Fixed Disk/Diskette Drive Adapter, 1M byte High-Capacity Diskette Drive, Six-Port Terminal/Host Attachment Card, Personal Computer Enhanced Keyboard, and Serial/Parallel Adapter

Safety Note: The Six-Port Terminal/Host Attachment is capable of driving up to 4000 feet of signal cabling to connect output devices via RS-422 interface. This cabling is to be indoor only. If there is a requirement to install part of the cable outdoors (outside the building), PRIMARY AND SECONDARY LIGHTNING SURGE PROTECTION MUST BE INSTALLED.

Prerequisites: The Series/1 System Unit requires an IBM 5151 Monochrome Display Model 001 (or equivalent) and the Monochrome Display and Printer Adapter (#4900 P/N 1504900) or a 5153 Color Display Model 001 and Color/Graphics Monitor Adapter (#4910 P/N 1504910).

Customer Setup (CSU): All models and special features of the Series/1 System Units are customer setup.

HIGHLIGHTS

- Entry Priced IBM Series/1 integrated with Personal Computer AT:
 - Series/1 microprocessor executes Series/1 programs
 - Personal Computer AT microprocessors control input/output devices
- Included with the 5170 Model 496 are:
 - An 8 MHz Personal Computer AT base unit
 - 1M byte Series/1 microprocessor
 - Six-Port Terminal/Host Attachment card
 - 30M byte fixed disk drive
 - High-Capacity diskette drive
 - Personal Computer Enhanced Keyboard
- Each Six-Port Terminal/Host Card supports:
 - Up to four 3101 Model 13, 23, or 881 via RS-422 (local)
 - --- or ---
 - Up to four 3161, 3163 of 3164 via RS-422 (local)
 - --- or ---
 - Combination of up to four 3101, 3161, 3163 and 3164
 - Two RS-232-C asynchronous ports (one can be used as a BSC line)

- Three feature slots available for additional functions
- Performs Series/1 floating point instructions - reduced speeds.
- Up to two 4201 or 4202 Proprinters may be attached.
- Asynchronous, BSC or SDLC communications options available (Personal Computer features).
- Required IBM Personal Computer Monochrome or Color Display (or equivalent) and standard Keyboard:
 - Used as a system console or
 - Provides features of the 3101 Display Station in block mode.
- Series/1 System Units may function as Personal Computer ATs.
- The following table shows the slot utilization:

Slot		Description
1	Used	Monochrome Display and Printer Adapter
2	Open	
3	Open	
4	Open	Optional Six-Port Terminal/Host Adapter
5	Used	Six-Port Terminal/Host Adapter
6	Used	Series/1 Processor and Memory
7	Used	Serial/Parallel Adapter
8	Used	Fixed Disk, Diskette Adapter

Standard on Model 496 is a 30M byte Fixed Disk Drive and the combination adapter. Average access time is 40 milliseconds. Each adapter also supports one optional 20M byte disk (#0205) or 30M byte disk (#0210) or one high capacity diskette (#0206) or one dual sided diskette drive (#0207).

- One High Capacity Diskette Drive is standard. Allows reading and writing data on both sides of a soft-sectored 5-1/4 inch diskette. Formatted capacity approximately 1M byte (1.2M byte with IBM Personal Computer DOS 3.0).
- The IBM 3161, 3163, and 3164 ASCII Display stations operate under control of the Input/Output Executive operating system in 3101 emulation mode, or, in non-emulation mode by use of data streaming.

Performance: IBM Series/1 5170 System Unit performance depends upon the number and type of devices attached to the system, the operating characteristics selected for those devices, and the types of application programs being used. Performance testing has indicated that the IBM Series/1 5170 System Unit with from one to eight terminals and limited communications, provides satisfactory throughput and response times for an entry level system. Communication lines, bisynchronous and SDLC, operate at speeds up to 9600 bits per second. Guidance on performance in specific application environments is available from your IBM representative.

Publications:

- "IBM Series/1 Pocket Digest" GX34-0104

- "IBM Series/1 Digest" G360-0061
- "IBM Series/1 Systems Selection Guide" GA34-0143
- "IBM Series/1 Customer Site Preparation" GA34-0050
- "IBM Series/1 Reference Summary" GA34-0034
- "IBM Series/1 System Unit Guide to Operations" GA34-0304
- "IBM Series/1 System Unit Hardware Maintenance and Service Manual" SX34-0184
- "IBM Series/1 System Unit Technical Reference Manual" SX34-0181
- "IBM Series/1 Input/Output Executive Installation and Programming Guide" SC34-0726

* Update Cards are included with these publications. If returned to IBM by the customer, publication updates will be sent automatically when they become available.

SPECIFY (NONE)

OPTIONAL FEATURES (STANDARD PERSONAL COMPUTER AT OPTIONS)

20Mb Fixed Disk Drive (#0205, P/N 6450205): This optional fixed disk drive may be installed as a second fixed disk drive. Space and power are provided in the System Unit for this drive. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the System Unit. A maximum of two fixed disk drives may be installed in a system. This second fixed disk drive and the second diskette drive are mutually exclusive.

High Capacity Diskette Drive (#0206, P/N 6450206): This optional 5-1/4 inch, dual-sided drive with 1.2M byte storage capacity in Personal Computer mode and 1M byte capacity in Series/1 mode, may be installed as the second diskette drive. Space and power are provided in the System Unit for this drive. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the System Unit. A maximum of two diskette drives may be installed in the System Unit. This second diskette drive and the second fixed disk drive are mutually exclusive.

Dual Sided Diskette Drive (#0207, P/N 6450207): This diskette drive permits the exchange of 320/360Kb diskette media between the Personal Computer AT, to the IBM Personal Computer XT, the IBM Personal Computerjr, and 5-1/4 inch, dual-sided drive with a 320/360Kb storage capacity. Space and power are provided in the System Unit for this drive. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the System Unit. A maximum of two diskette drives may be installed in a system. This second diskette drive and the second disk drive are mutually exclusive.

30Mb Fixed Disk Drive (#0210, P/N 6450210): This optional fixed disk drive may be installed as a second fixed disk drive. Space and power are provided in the System Unit for this drive. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the System Unit. A maximum of two fixed disk drives may be installed in a system. This second fixed disk drive and the second diskette drive are mutually exclusive.

Serial/Parallel Adapter (#0215, P/N 6450215): This option provides a second serial/parallel adapter card. The first is standard. This second adapter occupies one expansion slot in the System Unit. The programmable serial port provides asynchronous communications from 300 to 9600 bps. The adapter provides an RS-232-C port with a nine-pin, D-shell connector. Attaching the optional 10 foot Serial Adapter Cable (#0217 P/N 6450217) or the 10 inch Serial Adapter Connector (#0242 P/N 6450242) to the adapter provides the standard 25-pin EIA RS-232-C interface. The parallel port provides a 25-pin D-shell connector to interface devices requiring eight bit parallel data. NOTE: This adapter does not support current loop operation. The 5218 Printer is not supported.

Binary Synchronous Communications Adapter (#1204, P/N 1501204): The BSC Adapter provides an EIA RS-232-C interface. It is compatible with the IBM Personal Computer, the Portable Personal Computer, and the Personal Computer XT a maximum of two

BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter is installed.

SDLC Communications Adapter (#1205, P/N 1501205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only one SDLC adapter may be installed.

(Except LAD > IBM PC Network Adapter II (#1220, P/N 1501220): IBM PC Network Adapter II is a feature card which includes a modular broadband modem for connecting IBM Personal Computers to the IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds.

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). To take advantage of the 802.2 protocol, the IBM LAN Support Program must be installed on all workstations on the network. The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). < >

(Except LAD > IBM PC Network Adapter II supports English US and National Languages for English UK, French, German, Italian and Spanish. < >)

- (Except LAD > A feature card for the IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL). < >
- (Except LAD > National Language Support for English, German, French, Spanish and Italian. < >)

(Except LAD > Specified Operating Environment

- Machine requirements

IBM PC Network Adapter II requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). < >

(Except LAD > IBM PC Network Baseband Adapter (#1221, P/N 1501): IBM PC Network Baseband Adapter is a feature card which includes a modular baseband transceiver for connecting IBM Personal computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of the original PC, yet it takes advantage of greater Intel 80286 and 8086 processing speeds. It is designed specifically for IBM Personal System/2 Model 30.

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (P/N 83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to eight workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to ten daisy chains with eight workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <)

(Except LAD > IBM PC Network Baseband Adapter supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD > A feature card for IBM Personal System/2 Model 30 (8530) and IBM Personal Computers.
- Modular baseband transceiver for connection to the baseband IBM PC Network.
- Supports 802.2/LLC.
- Supports Remote Initial Program Load (RIPL).
- Uses IBM PC Network Baseband Extender for additional distance and for greater than eight nodes. <)
- (Except LAD > National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD > Specified Operating Environment

- Machine Requirements

IBM PC Network Baseband Adapter requires a full size adapter slot in one of the following system units:

- IBM Personal System/2 Model 30
- IBM 5150 Personal Computer
- IBM 5160 Personal Computer XT
- IBM 5170 Personal Computer AT
- IBM 5162 Personal Computer XT/286

- Programming requirements:

- IBM LAN Support Program (P/N 83X7873).
- IBM Personal Computer DOS 3.2 or higher with IBM PC Network Protocol Driver (P/N 6280061)
- IBM Personal Computer DOS 3.3 (P/N 6280060) or higher with IBM LAN Support Program (P/N 83X7873). <)

5170 Personal Computer AT S/370 Channel Emulator (#3200): The S/370 Channel Emulator is an adapter card for the IBM PC AT system which emulates the operation of an IBM System/370 channel. The card may be used with appropriate application software to channel attach certain S/370 devices to the PC AT. Prerequisites: None.

Customer Setup: Customer is responsible for Installation and Setup.

Highlights

- Single card for insertion in an IBM PC AT system unit
- 32K of on-card high speed memory
- Hardware support for Initial Selection and Data Transfer 370 channel sequences
- Read/write record size of up to 32K bytes
- Interlocked and data streaming interfaces may be emulated
- Byte, block or selector channel protocol may be emulated
- Support warranted for connection to the following 370 devices:
 - IBM 3820 Page Printer

Description: This adapter, when coupled with appropriate software, may be used to channel attach certain S/370 peripherals to the IBM PC AT.

The feature consists of a piggyback card which occupies a single slot and provides a D-shell connector to an interface cable. The interface cable is fitted with 370 BUS and TAG serpentine channel connectors for connection to the 370 peripheral.

The diagnostics may be used to check the operation of the card. The diagnostics require DOS V2.1 or later.

With appropriate software, a S/370 byte, block or selector channel may be emulated. Both the DC interlocked and data streaming protocols are supported.

Under software control, hardware assistance is available for the Initial Selection and Data Transfer channel sequences. An on-card buffer of 32k is used for the hardware data transfer sequence.

Publications: S/370 Channel Emulator Technical Library. This manual consists of:

- Guide to Operations
- Hardware Maintenance Guide
- Technical Reference
- Diagnostic diskette

Specify: The following components are included as part of feature #3200 or can be ordered separately.

- Card Assembly (P/N 70X5061)
- Cable (10 ft.) (P/N 70X4865)
- S/370 Channel Emulator Technical Library (P/N 6476158)

Six-Port Terminal/Host Attachment (#3629, P/N 6453629): This card is identical to the Six-Port card standard on the 5170 Model 495 or 496. It provides four RS-422 (local) ports and two RS-232-C asynchronous ports, one of which can be used as a BSC port. This card attaches up to four 3101 Model 13, 23, or 881 via RS-422 (local) - , or IBM 3161, 3163 or 3164 ASCII Display Stations via RS-422 local ports and other devices via the two RS-232-C ports.

Safety Note: The Six-Port Terminal/Host Attachment is capable of driving up to 4000 feet of signal cabling to connect output devices via RS-422 interface. This cabling is to be indoor only. If there is a requirement to install part of the cable outdoors (outside the building), PRIMARY AND SECONDARY LIGHTNING SURGE PROTECTION MUST BE INSTALLED.

2Mb Expanded Memory Adapter (#3905, P/N 2685193): Provides 2Mb of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30. The 2Mb Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICRO-SOFT.

The 2Mb Expanded Memory Adapter may be installed in any full length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT or Personal System/2 Model 30. However, a double socketed (16-bit) busslot is recommended for the Personal Computer AT and 3270 Personal Computer AT to enable the 2Mb Expanded Memory Adapter to achieve optimum performance.

The 2Mb Expanded Memory Adapter will backfill conventional memory from the 256Kb address to the 640Kb address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to two PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2Mb Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16Kb increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter

(up to 2Mb) through four 16Kb pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: One 2Mb Expanded Memory Adapter. Field Installation: Yes.

Personal System/2 Display Adapter (#4050, 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of one of the following displays: 8503, 8512, 8513 and 8514.

Monochrome Display and Printer Adapter (#4900 P/N 1504900): Provides for the attachment of the 5151 Monochrome Display Model 001 (or equivalent) to the 5170 Model 495 or 496.

(Except LAD > PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD > The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD > Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
Depth - 336mm (13.26 in.)
Height - 107.95mm (4.25 in.)
Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <)

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512Kb of user memory. Typical applications include protocol and/or data conversion for onboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128Kb Memory, 5.25 inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128Kb Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128Kb memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT
- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128Kb or 512Kb of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support

- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.
- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who

will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.

- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128Kb or 512Kb of memory, four or eight ports, and will be shipped with either 5.25 inch or 3.5 inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25 inch or 3.5 inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512Kb Memory Expansion (#6242, P/N 00F5529): Replaces the 128Kb of Co-Processor memory with 512Kb of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512Kb.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

Enhanced Memory Expansion Adapter (P/N 74X8635, #8635): This multifunction adapter provides up to 12Mb of memory, split memory addressing, a parallel printer port, and an asynchronous serial communications port. The adapter comes with Above Disc to convert extended memory to expanded memory for EMS applications. Memory for the adapter is sold separately. Memory module kits can be added in increments of .5Mb, 1Mb, or 2Mb up to a maximum of 3Mb, 5Mb, 6Mb, or 12Mb per adapter. A maximum of five adapters (4 in an XT-286) may be installed, providing a maximum of 15Mb of additional memory. The split memory addressing feature allows the base memory to be filled up to the 640Kb limit with the remaining adapter memory automatically becoming part of the expansion memory area.

The asynchronous serial communications port is a 9-pin D-shell RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer, or other serial device. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Con-

necter (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel printer port provides a 25-pin connector to connect a parallel printer.

One 16-bit expansion slot is required for each adapter. Adapters are customer installable. A maximum of two serial and three parallel ports are supported by the 5170. One serial and one parallel port is included in the 5170 models, except the 5170 Model 68. Adapters can be used to provide up to two serial and two parallel ports.

Machine requirements: The Enhanced Memory Expansion Adapter can be installed in all models of the IBM Personal Computer AT (5170). One 16-bit expansion slot is required for each adapter. The adapter is sold without memory. Therefore, memory must be purchased separately. The adapter can use the 512Kb Memory Module Kit (#3397) and the 1Mb Memory Module Kit (#3402) as well as the new 2Mb Memory Module Kit (#7833).

The adapter conforms to FCC Class B specifications.

Programming requirements: Use of Above Disc requires DOS 3.0 or higher.

Memory Module Kit (P/N 74X7833, #7833): Expands the memory capacity of the Memory Expansion Adapters (#3395), (#3400), and the Enhanced Memory Expansion Adapter (#8635) in increments of 2Mb up to a maximum of 12Mb per adapter. Each kit consists of two 1,024Kb memory modules which are inserted into memory module sockets on the adapter. A maximum of six kits can be added to each adapter. Kits are customer installable. Installation on Memory Expansion Adapters (#3395) and (#3400) will require removing all currently installed 256Kb and 512Kb memory modules.

- Memory expansion up to 12Mb.
- Split memory addressing.
- Parallel printer port and asynchronous communications port.
- New easy to install 1Mb memory module.
- Supports IBM Operating System/2.
- Supports LIM EMS with Above Disc.
- One year limited warranty.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

See your Country DP Supplies Coordinator.

5170-495 SERIES/1 SYSTEM UNIT

PURPOSE

The Series/1 System Unit, 5179 Mdl 495, is an entry level Series/1 product integrated with PC AT. Within the System Unit is a Series/1 microprocessor with 256K bytes of memory, a PC-AT microprocessor functioning as an I/O controller, a 20MB fixed disk drive, a 1MB diskette drive, a serial/parallel adapter, a PC AT keyboard and a six-port Terminal/Host Attachment card with four RS-422 (local) ports and two RS-232-C asynchronous ports.

MODELS

Model 495: System Unit and Series/1 Microprocessor with 256KB Memory integrated with PC AT with 512K bytes of memory, 20MB Fixed Disk Drive, Fixed Disk/Diskette Drive Adapter, 1MB Double-Sided Diskette Drive, Six-Port Terminal/Host Attachment Card, PC AT Keyboard, and Serial/Parallel Adapter.

Safety Note: The Six-Port Terminal/Host Attachment is capable of driving up to 4000 feet of signal cabling to connect output devices via RS-422 interface. This cabling is to be indoor only. If there is a requirement to install part of the cable outdoors (outside the building), PRIMARY AND SECONDARY LIGHTNING SURGE PROTECTION MUST BE INSTALLED.

Prerequisites: The Series/1 System Unit, 5170 Mdl 495 requires a 5151 Monochrome Display mdl 001 (or equivalent) and the Monochrome Display and Printer Adapter (#4900 P/N 1504900) or a 5153 Color Display mdl 001 and Color/Graphics Monitor Adapter (#4910 P/N 1504910). Series/1 Input/Output Executive (5917-EM1).

Customer Setup (CSU): All mdls and special features of the Series/1 System Unit, 5170-495, are customer setup.

HIGHLIGHTS

- Entry Priced IBM Series/1 integrated with PC AT:
 - Series/1 microprocessor executes Series/1 programs
 - PC AT microprocessor controls input/output devices
- Included with the 5170 Mdl 495 are:
 - Six-Port Terminal/Host Attachment card
 - 20 megabyte fixed disk
 - 1 megabyte diskette
 - PC AT Keyboard
- Each Six-Port Terminal/Host Card supports:
 - Up to four 3101 Mdl 13, 23, or 881 via RS-422 (local)
 - --- or ---
 - Up to four 3161 or 3163 via RS-422 (local)
 - --- or ---
 - Combination of up to four 3101, 3161, and 3163
 - Two RS-232-C asynchronous ports (one can be used as a BSC line)
- Three feature slots available for additional functions.
- Series/1 memory expandable to 512K bytes in 128K byte increments.
- Performs Series/1 floating point instructions - reduced speeds.
- Up to two 4201 Proprinters may be attached.
- Asynchronous, BSC or SDLC communications options available (PC features).
- Required IBM PC Monochrome or Color Display (or equivalent) and standard Keyboard:

- Used as a system console or
- Provides features of the 3101 Display Station in block mode.

- The 5170 Mdl 495 may function as a PC AT.
- The following table shows the slot utilization and memory on the system board:

SLOT	DESCRIPTION
1 Used	Monochrome Display and Printer Adapter
2 Open	
3 Open	
4 Open	Optional Six-Port Terminal/Host Adapter
5 Used	Six-Port Terminal/Host Adapter
6 Used	Series/1 Processor and Memory
7 Used	Serial/Parallel Adapter
8 Used	Fixed Disk, Diskette Adapter

- Two additional Series/1 memory increments of 128KB can be installed on the S/1 processor card.
- One 20M byte Fixed Disk Drive and combination Disk/Diskette Adapter is standard in the 5170 Mdl 495. The disk has 40 millisecond average access time, 32-bit error correction code (ECC), 615 cylinders, 4 data surfaces and 500K bit per second transfer rate. Adapter is microprocessor controlled and provides sector buffers to prevent overrun, internal diagnostics and automatic retries on error. Adapter supports one optional 20M byte disk (#0205) or diskette.
- One Double-Sided Diskette Drive is standard. Allows reading and writing data on both sides of a soft-sectored 5 1/4 in. diskette. Formatted capacity approximately 1MB (1.2M byte with IBM PC DOS 3.0). Diskette characteristics: 96 tracks/in., 80 tracks per surface, two data surfaces per diskette, 300 RPM rotational speed, six ms track-to-track access time, 32K byte per second data transfer rate. Second diskette (#0206) mutually exclusive with second 20M byte fixed disk.

Performance: Series/1 5170 system unit performance depends upon the number and type of devices attached to the system, the operating characteristics selected for those devices, and the types of application programs being used. Performance testing has indicated that the Series/1 5170 system unit with from one to eight terminals and limited communications, provides satisfactory throughput and response times for an entry level system. Communication lines, bisynchronous and SDLC, operate at speeds up to 9600 bits per second. Guidance on performance in specific application environments is available from your IBM representative.

Publications: "IBM Series/1 System Unit, Guide to Operations", (GA34-0304), 6322530:

This publication provides installation and reference information for the IBM Series/1 System Unit, 5170 Mdl 495, and associated features and options. The information in this book is intended to guide the operator who does not have special training or experience in computers.

"IBM Series/1 System Unit, Hardware Maintenance and Service Manual", (SX34-0184):

This manual contains maintenance information for the Series/1 System Unit, 5170 Mdl 495. Description and procedures are provided to support the system at the field-replaceable-unit (FRU) level.

The information in this manual is intended for use by IBM representatives (CSRs) and customer service personnel experienced in maintenance of computer systems.

SPECIFY

- Industrial Automation Systems Specify:

Plant Floor Systems (#9010): Collection or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

OPTIONAL FEATURES (STANDARD PC AT OPTIONS)

20MB Fixed Disk Drive (#0205 P/N 6450205): One optional fixed disk drive may be installed as a second fixed disk drive, on Mdl 495, providing a total of 40MB of fixed disk storage capacity. Space and power are provided in the system unit for this drive. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. Increased performance of 40 ms average access time is possible from the quasi-closed loop servo positioning system utilized in the drive. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit.

Characteristics:

- 20MB of storage
- 512 bytes per sector
- 17 sectors per track
- 615 tracks per surface (cylinders)
- 40 ms average access time
- Four surfaces
- 3573 RPM
- 5M bit per second transfer rate
- Dimensions:
 - Height - 82.55mm (3.25 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 2.9 Kg (6.4 lbs.)

High Capacity Diskette Drive (#0206 P/N 6450206): This is a half-high, 5 1/4 inch, dual-sided drive with 1.2MB storage capacity in PC mode and 1MB capacity in Series/1 mode. Space and power have been provided in the system unit for up to two drives. The drive is fully self-contained and consists of a spindle drive system, a read positioning system and a read/write/erase system. One of these drives is standard. An optional second drive (#0206) may be installed in the system unit directly under the first if the space is not occupied by another disk or diskette drive. Both drives use the standard fixed disk and diskette drive adapter in the system unit.

The drive uses the new 96-TPI, high-density media. In addition, it will read or write 48-TPI, single- or dual-sided media written for the IBM PCjr, IBM PC, IBM PC XT, and IBM Portable PC, giving a high level of compatibility with existing applications. However, once the 48-TPI media has been written in this drive, it may only be readable on a high capacity diskette drive.

Characteristics:

- 1MB storage in Series/1 mode
- 1.2MB storage in PC mode
- 512 bytes per sector
- 15 sectors per track
- 96 tracks per inch
- Two sides
- 80 tracks per side
- 360 RPM
- Supports 300 and 500 kilobits/sec data transfer rate

- 94 ms average access time in 96-TPI mode
 - Height - 42.9mm (1.7 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 1.6 Kg (3.5 lbs.)

Dual Sided Diskette Drive (#0207 P/N 6450207): This diskette drive permits the exchange of 320/360KB diskette media between the PC AT, to the IBM PC, the IBM PC XT, the IBM PCjr, and the IBM Portable PC. It is a half-high, 5 1/4 inch, dual-sided drive with a 320/360KB storage capacity. Space and power for one drive have been provided in the system unit. The drive is fully self-contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system. It is installed in the system unit directly under the standard high capacity diskette drive if the space is not occupied by another fixed disk or diskette drive. This drive uses the standard fixed disk and diskette drive adapter in the system unit.

Characteristics:

- 320KB of storage in Series/1 Mode
- 360KB of storage in Personal Computer Mode
- 512 bytes per sector
- 8/9 sectors per track
- Two sides
- 91 ms average access time
- 40 tracks per surface
- 48 tracks per inch
- 300 RPM
- Transfer rate of 250K bits/second
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 1.6 Kg (3.5 lbs.)

Serial/Parallel Adapter (#0215 P/N 6450215): This option provides a serial port and a parallel port. It occupies only one expansion slot of either type. The serial portion is fully programmable and supports asynchronous communications from 300 to 9600 baud. The back of the adapter has a nine-pin, D-shell connector that is classified as an RS-232-C port. When the optional 10 foot Serial Adapter Cable (#0217 P/N 6450217) or 10 inch Serial Adapter Connector (#0242 P/N 6450242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. A second serial/parallel adapter may be installed. One is standard.

Note: This adapter does not support current loop operation. The 5218 Printer is not supported.

Additional Series/1 Processors Storage 64KB Memory Module Kit (#1003 P/N 1501003): Provides a 64KB increment of parity-checked random access memory which may be plugged into sockets on the Series/1 processor card. Maximum: Up to four 64KB Memory Module Kit increments may be installed on the Series/1 processor card to provide an additional 256KB. Field Installation: Yes. Prerequisites: Available sockets on the Series/1 processor card on available sockets. Must be installed in 128KB increments on Series/1 CPU board. Customer Setup: Yes.

Binary Synchronous Communications Adapter (#1204 P/N 1501204): The BSC Adapter provides an EIA RS-232-C interface. It is compatible with the IBM PC, the Portable PC, and the PC XT. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter is installed.

SDLC Communications Adapter (#1205 P/N 1501205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only one SDLC Adapter may be installed.

Monochrome Display and Printer Adapter (#4900 P/N 1504900): Provides for the attachment of both the 5151 Monochrome Display Mdl 001 (or equivalent) to the 5170 model 495.

Six-Port Terminal/Host Attachment (#3629 P/N 6453629): This card is identical to the Six-Port card standard on the 5170 model 495. It

MACHINES

provides four RS-422 (local) ports and two RS-232-C asynchronous ports, one of which can be used as a BSC port. This card attaches up to four IBM 3101 mdI 23 Display Stations, or IBM 3161 or 3163 ASCII Display Stations via RS-422 local ports and other devices via the two RS-232-C ports.

Safety Note: The Six-Port Terminal/Host Attachment is capable of driving up to 4000 feet of signal cabling to connect output devices via RS-422 interface. This cabling is to be indoor only. If there is a requirement to install part of the cable outdoors (outside the building), PRIMARY AND SECONDARY LIGHTNING SURGE PROTECTION MUST BE INSTALLED.

Six-Port Terminal/Host Attachment Card Cables/Cable Kit:

	Option Number	Feature Number	Contact IBM.
3101 Display Terminal,			

15m (50 ft.) Cable 6450401 0401

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

5173 PC NETWORK BASEBAND EXTENDER**PURPOSE**

The 5173 PC Network Baseband Extender is the extender unit for connecting IBM Personal Computers and IBM Personal System/2 models to the baseband IBM PC Network. The 5173 PC Network Baseband Extender supports up to 80 nodes in a star topology, with up to 400 feet of 4-wire twisted-pair ICS Type 3 specification telephone wire, between an extender and the far end of a daisy chain. The 5173 PC Network Baseband Extender accepts modular telephone jacks and supports the IBM Cabling System Types 1, 2, 6, 8 and 9. The 5173 PC Network Baseband Extender connects to any 110/220/240V AC 50/60Hz power source.

(Except LAD > 5173 PC Network Baseband Extender supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- Extender unit for the baseband IBM PC Network.
- Supports up to 80 nodes.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports the IBM Cabling System (Types 1,2,6,8,9 and Type 3 specification).
- (Except LAD > National Language Support for English, German, French, Spanish and Italian. <)

MODELS**Model 1 001**

Power Supply: The 5173 PC Network Baseband Extender connects to any 110/220/240V AC 50/60Hz power source.

Operating Characteristics: The 5173 PC Network Baseband Extender is designed for continuous unattended operation, therefore it does not have an ON/OFF switch. There are also no set up option switches or jumpers either. The 5173 PC Network Baseband Extender has one indicator which is lit if power is applied. The indicator can either be red or green depending on whether an error

was detected by the built in test circuitry. The built in test circuitry is initiated by depressing the push button on the front panel.

Specified Operating Environment:

- Dimensions: 2.6 inches high, 17.01 inches wide, 7.07 inches deep
- Weight: 7 lbs 2 oz.
- Power Consumption: 15.84 Kilowatts/month
- EMC Characteristics: FCC Class A and IOP
- Agency Certifications: UL, CSA and TUV

Programming Requirements: The 5173 PC Network Baseband Extender has no programming requirements.

ACCESSORIES

IBM PC Network Baseband Extender Rack Mount Kit (P/N 1501226): Attaches to the 5173 PC Network Baseband Extender and allows the IBM 5173 to be mounted in a standard 19 inch equipment rack.

IBM PC Network Baseband Adapter Cable (P/N 1501229): Has modular telephone connectors at each end and is designed to serially connect the IBM PC Network Baseband Adapter or the IBM PC Network Baseband Adapter/A to other baseband PC Network workstations or to the 5173 PC Network Baseband Extender.

The IBM PC Network Baseband General Purpose Cable (P/N 1501228): Connects an IBM PC Network Baseband Adapter or IBM PC Network Baseband Adapter/A to a non-modular telephone receptacle.

IBM Cabling System PC Network Baseband Cable (P/N 1501227): Connects the IBM PC Network Baseband Adapter, the IBM PC Network Baseband Adapter/A, or the 5173 PC Network Baseband Extender to the data connector wall jack or data connector distribution panel. Each baseband cable is 25 feet long and must be ordered separately.

5175 PROFESSIONAL GRAPHICS DISPLAY**PURPOSE**

The 5175 Professional Graphics Display when connected to the IBM Personal Computer Professional Graphics Controller, provides high definition graphics for the IBM Personal Computer XT, IBM Personal Computer Expansion Unit and IBM Personal Computer AT systems.

MODELS

Model 1 001

Model 2 002

Model 3 003

Maximum: One.

Prerequisites: A 5160 Personal Computer XT, IBM 5161 Personal Computer Expansion Unit, or a 5170 Personal Computer AT system with the Professional Graphics Controller (#1501) is required.

Customer Setup (CSU): The 5175 is a customer setup machine. Detailed setup and operational instructions are included with each machine. The customer is responsible for unpacking the 5175, attaching it to the Professional Graphics Controller, and obtaining an operating system version that supports the 5175.

HIGHLIGHTS

- Connected to the 5160, 5161 or 5170 with the Professional Graphics Controller and a 1.5m (5 ft) cable that is provided.
- Two modes of operation are supported:
 - Expanded graphics to support all the facilities of the 5175 display.
 - Emulation to support the facilities of the Color Graphics Monitor adapter.
- Red, Green, Blue analog input device.
- Separate brightness, contrast and on/off controls.
- High contrast and reduced glare provided by the dark etched screen.
- 0.31mm shadow mask CRT provides clarity and detail.
- Non-interlaced operation.

- The 5175 Professional Graphics Display has the following additional characteristics:

- Screen size. 330mm (13 in.) (diagonal) monitor.
- 640 (horizontal) x 480 (vertical) addressability.
- 256 colors simultaneously from a palette of 4096 colors.
- Horizontal scanning frequency of 30.48K Hz.
- Vertical Frame Rate of 60 Hz.
- Operating temperature: 16 degrees C to 32 degrees C ambient (60 degrees F to 90 degrees F).
- Storage temperature: 10 degrees C to 43 degrees C (50 degrees F to 110 degrees F).
- Relative humidity: 8% to 80% (non-condensing) when on; 20% to 80% (non-condensing) when off.

- Dimensions:

Width - 394mm (15-1/2 in.)
Depth - 432mm (17 in.)
Height - 292mm (11-1/2 in.)
Weight - 12kg (26 lbs.)

SPECIFY

- Voltage (120V AC, 60 Hz, 1 A, 330 BTU/hour): No specify required.
- Voltage (192-255V AC, 50/60 Hz, IEC 380, TUV GS safety mark): No specify required.

SPECIAL FEATURES (NONE)**MODEL CONVERSIONS (NONE)****ACCESSORIES (NONE)****SUPPLIES (NONE)**

5181 COMPACT PRINTER

(NO LONGER AVAILABLE)

PURPOSE

The 5181 Compact Printer Model 001 is a low-cost light weight dot matrix printer that may be attached to the 4860 PCjr, the 5150 Personal Computer, and the 5160 Personal Computer XT. The 5181 Model 001 provides 50 characters per second print speed and all-points-addressable graphics on thermally-sensitive cut sheet, roll, or fanfold paper.

MODELS

Model 1 001

Limitations: The 5181 will not operate on the 4860 PCjr if the Parallel Printer Attachment (4860 feature #0009) is installed. The Compact Printer is compatible with Personal Computer programs, but certain unique characteristics should be recognized when using application programs designed for the 5150 or 5160. Limitations and unique characteristics are outlined in detail in the manuals provided with the printer.

Prerequisites: For use with the 4860 PCjr the attachment cable, provided as standard with the 5181 plugs into the PCjr serial device connector. For use with the 5150 Personal Computer or 5160 Personal Computer XT, an asynchronous communications adapter (feature #2074 on the 5150 or 5160) is required. The Compact Printer connector adapter (#0102) is also required.

Customer Setup (CSU): Yes.

HIGHLIGHTS

- Thermal technology
- Serial interface
- Four print modes:
 1. 80 characters per line, 10 cpi (standard)
 2. 40 characters per line, 5 cpi (double width)
 3. 136 characters per line, 17.5 cpi (compressed)
 4. 68 characters per line, 8.75 cpi (compressed double width)
- Print speed (instantaneous):
 - 50 cps (standard character print)
 - 2,400 dots per second (image print)
- Throughput: 25 cps (typical)
- Printing mode: Unidirectional (left to right)
- Paper handling:
 - Friction feed

- 216mm (8.5 in.) width maximum
- Line spacing: Program selectable at 6 lines/in. or 9 lines/in.
- Print quality: 560 dots per 8-inch line; 8 dots vertically.
- Print matrix: Thermal head technology; 5 x 8 dot matrix (5 x 7 for all alphabetic characters except lowercase).
- Interface:
 - Serial EIA (modified RS-232-C)
 - 1200 bps
 - 8-bit ASCII (two stop bits; no parity check)
 - 256-character buffer

Physical Specifications

Width - 312mm (12.3 inches)
Depth - 220mm (8.7 inches)
Height - 88mm (3.5 inches)
Weight - 3.0kg (6.6 pounds)

Customer Responsibilities: The customer is responsible for unpacking and setting up the 5181 attaching it to the system unit, and running the power-on diagnostics. Necessary installation instructions are packed with the printer.

SPECIFY

- Voltage (120V AC, 50/60 Hz, 36 W): 3-prong grounded plug. No specify required.

MODEL CONVERSIONS (NONE)

SPECIAL FEATURES

Compact Printer Connector Adapter (#0102): Required for attachment of the 5181 to the 5150 Personal Computer or to the 5160 Personal Computer XT. The connector adapter mates the 16-pin connector on the compact printer cable, which comes as standard on the 5181, with the 25-pin connector of the asynchronous communications adapter on the 5150 or 5160.

ACCESSORIES (NONE)

SUPPLIES

Paper is available from your Country Supplies Coordinator or IBM as follows: roll (P/N 1503923) 89 feet/2 rolls per box; cut sheet (P/N 1503924) 250 sheets; fanfold (P/N 1503926) 250 pages. All paper is 8.5 inches wide, and each sheet or page is 11 inches long. Additional information is available from your Country Supplies Coordinator.

5182 Color Printer

PURPOSE

The 5182 Color Printer is a versatile bidirectional dot-matrix printer that may be attached to the 5150 Personal Computer, the 5160 Personal Computer XT or the 3270 Personal Computer, and the 5292-2 (Graphics model) Color Display. The 5182 prints reports and graphic images in any of three programmable states: All black, 4-color (red, green, blue, black), and 8-color (yellow, magenta, cyan, black, orange, green, violet, brown) at speeds of 35 to 200 cps, depending on the image quality desired. Three levels of printing are available: Draft at 200 cps, text or correspondence at 110 cps, and near-letter-quality at 35 cps. The last is achieved by dense matrix imaging in a 2-pass print cycle.

MODELS

Model 001

Prerequisites: System unit or expansion unit attachment is made via the Monochrome Display and Printer Adapter (#4900) on the 5150 or 5160, or the Printer Adapter (#5200) on the 5150, 5160 or the 5272. 5292-2 attachment is made via the printer connector on the 5292-2. A Printer Cable (#5612) is required.

Customer Setup (CSU): Yes.

HIGHLIGHTS

- Dot-matrix color printer.
- Parallel interface.
- Bidirectional printing.
- 13.2 inch print line - 132 print columns (10 cpi).
- Character set: 191 characters compatible with 5152 mdl 002 Graphics Printer - 96-character upper/lower case ASCII with lower case descenders and IBM Personal Computer special characters.
- Paper width: 127mm to 375mm (5.0 in. to 14.9 in.).
- Paper feeds:
 - Tractor feed.
 - Manual single-sheet feed.
- Paper types:
 - Fanfold.
 - Cut sheet.
 - Single ply.
 - Up to 4-part form (tractor feed only).
- Print speed/quality:
 - 200 cps draft mode (default mode).
 - 120 cps text - proportional spacing.
 - 110 cps text - fixed spacing.
 - 35 cps near-letter-quality (NLQ).
- Print matrix:
 - 8 x 9 draft mode
 - 24 x 9 text mode
 - 36 x 18 NLQ
 - 24 x 14 graphics
- Print head: ballistic type using 9-wire (5 x 4 array) staggered design.
- Character size/pitch: 0.09 in. to 0.10 in. high; 10, 12, 17.1 cpi, double-width characters at each line density; super and subscripting via line indexing - smaller size image, all fonts; line graphic characters 0.167 in. high. 10 pitch is standard. Two aspect ratios are supported: 5:6 (standard), 1:1 (selectable).
- Programmable features: Print mode; line spacing; line width; forms length; intercharacter spacing; margins; tabs; auto underline; fixed/proportional character spacing; auto text justification.
- Forms length control: Switch- and software-selectable; 8.5, 11.0, 12.0, 14.0 in.; also auto perforation skip; TOF control by operator (offline); arbitrary form lengths are software-selectable.
- Slew rate: Stepper-motor pinfeed tractor; 5.0 in./sec.
- Line spacing: 6 or 8 lines/in., switch-selectable. Arbitrary line spacing is software-selectable for bit-image graphics.
- Line buffering: 6KB buffer.

- Graphics: 82.5 x 82.5 DPI matrix (1:1 aspect ratio); each of upper eight print head wires is addressable by one bit of each byte sent in graphics mode. All points addressable.
- Ribbon: Easy-change cartridge 0.75 in. wide, 36 yd. long; 1.5 million character color ribbon; "fails" if a band fails (that is, a dot is unprinted); standard eight colors mixable-color ribbon (yellow/magenta/cyan/black) shipped with each printer.
- Ribbon saver: Automatic band lift at end of page (black ribbon usage).
- Printer diagnostics: Auto power-on; operator-initiated self-test with alphameric patterns repeated, colors tested; host-driven test.

Physical Specifications:

Width - 549mm (22.8 inches)
Depth - 315mm (13.95 inches)
Height - 231mm (10.0 inches)
Weight - 16.3kg (40 pounds)

Customer Responsibilities: The customer is responsible for unpacking and setting up the Color Printer, attaching it to the system unit, and running the power-on diagnostics. Necessary installation instructions are packed with the printer.

Publications: *Color Printer Hardware Maintenance and Service Manual* (#2383): Provides diagnostic and service information for the 5182 Color Printer.

SPECIFY

- Voltage (100/120/200/220V AC, 50/60 Hz): Factory set to 120V AC, 60 Hz. No specify required.
- Power cord standard. No specify required.

MODEL CONVERSIONS (None)

SPECIAL FEATURES

Color Printer Paper Rack (#0101): Provides a convenient stand for stacking printed paper. Attaches by simply snapping ends into indicated holes in printer cover. The option is a wire rack which can hold a stack of single sheets or continuous fanfold paper printed by the 5182 Color Printer. **Maximum:** One. **Field Installation:** Yes. **Customer Setup:** Yes.

Printer Cable (#5612): Required for attachment to the monochrome display and printer adapter or the printer adapter of the 5150 or 5160. Also required for attachment to the printer connector on the 5292-2.

ACCESSORIES (None)

SUPPLIES

Ribbons: Ribbons for the 5182 Color Printer are available from SSD as follows: Black (P/N 6320194); 4-color primary (red, green, blue, black) (P/N 1501573); 8-color process (yellow, magenta, cyan, black); to obtain 8-color capability, the printer must make a second pass and ribbon shifts to mix the colors (P/N 1501574). Additional information is available from IBM.

5201 QUIETWRITER PRINTER MODEL 1

THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT

PURPOSE

A new, very quiet, non-impact, letter quality printer for attachment to the IBM Personal Computers (5150, 5160, PC AT, Portable PC/3270PC, 3270PC-G, 3270PC-GX, PCjr Parallel Interface), to Non-IBM Personal Computers compatible with the IBM Personal Computer Parallel Interface, and to 3197 Display Station Models C and D. The 5201 Quietwriter(R) Printer bursts prints at 40-60 characters per second (cps), depending on the pitch used: That means the user, when in 15 cpi, can print data processing applications at 60 cps and high-quality word processing applications at 40-48 cps, when in 10 or 12 cpi. The 5201 features an optional sheetfeed and a pinwheel form feed. Both optional features are customer installable. The user can, therefore, choose between continuous forms and automatically fed cut sheets. The 5201 offers a variety of fonts that easily plug into the printer, with any two being available online at a given time. Each font offers the full 252-character IBM Personal Computer set. With two different font styles, the user can have up to a total of 504 characters online.

Note: The 5201 is shipped with a printhead, a ribbon, a (Courier 10) PC type font, and an accessory kit.

The accessory kit contains the IBM Quietwriter Printer Guide to Operations, a line cord, a paper table, and the IBM Quiet Cleaning Cartridge.

The printer attaches to the IBM Personal Computer via the IBM PC Printer attach cable (#7890, P/N 1525612). Attaching the printer to other than the IBM Personal Computer may require a different cable.

* Trademark of the IBM Corporation.

MODEL 1

I Model 001: (NO LONGER AVAILABLE)

Limitations:

- **Type Fonts:** The 5201 Quietwriter Printer may utilize any one of a variety of 252 character type fonts on any printing operation. It is the customer's responsibility to match the type font selected to the printing operation.
- **Continuous Forms:** It is not recommended to use continuous paper without the pinwheel forms feed feature. Both edges of the pinfeed forms must be threaded.
- **Paper Specifications:** Maximum paper width is 381mm (15 in.); maximum pin-to-pin width for continuous forms is 368mm (14.5 in.). Maximum print-line width is 335mm (13.2 in.).
- **Single Sheetfeed:** Single sheetfeed is by hand insertion, unless the optional automatic cut-sheet feed feature is used.
- **Paper Recommendations:** In general, the 5201 provides good print when using papers with maximum roughness of 200 Sheffield points. Most 20-lb. xerographic papers meet this requirement. When using forms, a smooth paper gives better print quality than rough paper.

Listed below are only a few of many recommended papers:

- ARDOR(1) XEROCOPY
- Champion(2) Bond
- Hammermill FORE(3) XEROCOPY
- IBM Multi-System Paper
- Mead INFO XEROGRAPHIC
- Nekoosa(1) Bond
- Springhill(4) Business Paper

- (1) Trademark of Nekoosa Papers Inc.,
- (2) Trademark of Champion International Corporation
- (3) Trademark of Hammermill Papers Group
- (4) Trademark of International Paper Co.

- See the "IBM Quietwriter Printer Guide to Operations" for limitations on reverse line feed.
- Attachment to other than IBM products may require other than the IBM PC Printer cable.
- **Head Tilt:** The Quietwriter Printer does graphics, character box by character box. This may possibly result in vertical bars not being exactly aligned.
- The IBM Quiet Non-Correcting Ribbon (P/N 1299642) is not recommended to be used for direct image offset masters or negotiable instruments and similar documents.

The Quietwriter Printer, Model 1 uses the new IBM Quiet Non-Correcting Ribbon (P/N 1299790), and the improved IBM Quiet Printhead. The new ribbon, which replaces the IBM Quiet Non-Correcting Ribbon (P/N 1299642), provides a darker, bolder print image that is indelible. The new ribbon is recommended for negotiable instruments. By using the new ribbon and the improved printhead, customers can achieve better print quality. In addition, customers may now print directly on transparencies in the single sheet manual feed mode.

Customer Setup and Responsibilities: The 5201 is designated a customer-setup machine. Customer-setup instructions are shipped with the machine. The allowance is one day.

HIGHLIGHTS

- Letter quality non-impact printing.
- 40-60 cps burst print speed.
- Two online selectable type fonts.
- Four pitches and multiple type styles including word processing type fonts.
- 252 characters per type font.
- Drop-in ribbon cartridge.
- Optional paper handlers for sheetfeed and continuous pinwheel form feeder.
- 13.2-inch writing line.
- Program-selectable vertical spacing in 1/96 inches/line increments.
- 8.5-inch wide paper can be fed automatically with the cut-sheet feed.
- 2.5-inch to 14.5-inch (pin-to-pin) paper can be fed with the continuous forms feed.
- 3-inch to 15-inch paper can be manually inserted.
- IBM Personal Computer Parallel interface.

Physical Specifications:

Width: 541mm (21.3 in.)
Depth: 367mm (14.4 in.)
Height: 216mm (8.5 in.)
Weight: 10.0kg (22 lbs.)

Note: The Quietwriter Printer conforms to UPS shipping requirements.

Ordering: Model 001 (5201-001) has an IBM Personal Computer parallel interface.

SPECIFY

- (Except Australia > Voltage (90-137V AC, 1-phase, 60 Hz): No specify required.) <
- (Australia only > Voltage (180-259V AC 1-phase 50/60 Hz): No specify required.) <
- Cable lengths (required to cable connect the 5201 to the Personal Computer). Cable length is 1.8m (6 ft). Order P/N 8509386 for the 5150 and 5160. To attach 3197 Display Station Models C and D, order P/N 6457008.
- Color: Single color only (no specify required).
- Language translations available at time of shipment for the Guide to Operations. The code will also determine the machine nomenclature shipped with the machine.
English #1341342 Spanish #1341346
French #1341344
- Type Font Type Style: One is provided with the machine. Additional type fonts may be ordered as supplies by reorder number. See your Country DP Supplies Coordinator.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

SUPPLIES/ACCESSORIES

Paper Tray: P/N 8655073 provides additional trays for Sheetfeed Paper Handler. Eliminates paper removal/installation from trays when customer uses a wide variety of papers.

Ribbons (P/N 1299642): The IBM Quiet Non-Correcting Ribbon. An additional ribbon is needed to diagnose some problems. See your Country DP Supplies Coordinator.

Printhead (P/N 1337488): The IBM Quiet Printhead. An additional printhead is needed to diagnose some problems. See your Country DP Supplies Coordinator.

Type Fonts: None required with machine order. Additional type fonts are available in a variety of print styles, and character sets (see "Type Catalog"), and are interchangeable with the type font supplies with the machine. When ordering, consideration should be given to ordering a second identical type font for backup. Replacement and installation of the type font is the customer's responsibility. Contact IBM for ordering instructions.

TYPE FONT SUPPORT FOR PC

Country	Prestige	Courier	Pres-	Bold-
Keybd	Elite	10	tige 15	face
US	1340803	1340810	1340806	1340830
UK	1340803	1340810	1340806	1340830
Germany	1340803	1340810	1340806	1340830
France	1340803	1340810	1340806	1340830
Italy	1340803	1340810	1340806	1340830
Spain	1340803	1340810	1340806	1340830

Note: For a complete listing of 5201 Quiet Electronic Fonts (including reorder numbers) see the Typestyle Brochure, G570-2099, distributed at announcement time.

5201 QUIETWRITER PRINTER MODEL 2

PURPOSE

A quiet, non-impact, letter quality printer with high resolution APA capability for attachment to the 3192 Model G or 3979 Model 1 (when attached to the 3192 Model G only), IBM Personal Computer (5150, 5160, 5170, Portable PC, 3270PC, 3270PC-G, 3270PC-GX, 3270PC AT-G, 3270PC AT-GX), (PC Jr Parallel Interface), to Non-IBM Personal Computers compatible with the IBM Personal Computer Parallel Interface, and to 3197 Display Station Models C and D. The Quietwriter* Printer Model 2 bursts prints at 40-60 characters per second (cps), depending on the pitch used; that means the user, when in 15 cpi, can print data processing applications at 60 cps and high quality word processing applications at 40-48 cps, when in 10 or 12 cpi. The Quietwriter Printer Model 2 features an optional sheetfeed and an optional pinwheel form feeder. Both options are customer installable. The user can, therefore, choose between continuous forms and automatically fed cut sheets. The Quietwriter Printer Model 2 offers a variety of fonts that easily plug into the printer, with any two being available on-line at a given time. Each font offers the full 252 character IBM Personal Computer set. With two different font styles, the user can have up to a total of 504 characters on-line.

APA graphics support will enable the Quietwriter Model 2 to print graphics output from the IBM Personal Computer. It will support the graphics commands that currently operate the 5152 Graphics Printer and the IBM Proprietary and will operate with the addressability of the 5152 (72X60, 72X120, 72X40) (dots per inch vertical by horizontal). Three new addressing modes (60X60, 120X120, 240X240) will be provided to allow higher quality graphics. The printer uses a two or three pass approach during graphics operations. Graphics and text modes may be alternatively used in the same document.

The performance switch, which is standard on the Model 2, allows the user to operate the printer in a normal printing mode or in a "performance" mode. In the normal mode the printer scans the character stream to be printed. If more than two blank spaces are detected, the printhead is lifted from the paper and is "tabbed" to the next location where a character will be printed. This will provide optimum ribbon yield. For applications such as spread sheets where many columns of data are separated by small separations of blanks, this saving of ribbon can reduce the throughput of the printer. The "performance mode" allows the printer to maintain a higher average carrier speed by passing over blank spaces of less than two inches without lifting the printhead. The performance switch allows the user to choose (when the printer is initialized) the most appropriate mode for the application by switching a DIP switch on the printer function board.

The Quietwriter Printers, Model 1 and Model 2, use the new IBM Quiet Non-Correcting Ribbon (P/N 1299790), and the improved IBM Quiet Printhead. The new ribbon, which replaces the IBM Quiet Non-Correcting Ribbon (P/N 1299642), provides a darker, bolder print image that is indelible. The new ribbon is recommended for negotiable instruments and high quality APA graphics. By using the new ribbon and the improved printhead, customers can achieve better print quality. In addition, customers may now print directly on transparencies in the single sheet manual feed mode.

MODEL 2

Model 2 002

Limitations:

- **Type Fonts:** The Quietwriter Printer Model 2 may utilize any one of a variety of 252-character type fonts on any printing operation. It is the customer's responsibility to match the type font selected to the printing operation.

An IBM Quiet Electronic Font PC is recommended for use with this printer. All of the IBM Personal computer or IBM personal

computer XT system characters are available in the following type styles:

Prestige 15
 Boldface
 Courier 10
 Prestige Elite
 Courier 10
 Prestige Pica
 Title
 Letter Gothic

An IBM Quiet Electronic Font Type A(APG only>, H<) multilingual cartridge is required for attachment of the 5201 Quietwriter(R) Printer Model 2 to the 3192 Model Gs. These fonts are available in a variety of typestyles and pitches.

Font Type A multilingual cartridges support US English and the following languages:

Canadian French
 Spanish

(APG only>Font Type H multilingual cartridge supports Japanese Katakana.<)

Printer Specifications and additional type font specifics may be found in the "IBM Quietwriter Printer Guide to Operations" or the "Technical Reference Manual".

- **Continuous Forms:** It is not recommended to use continuous paper without the pin-wheel forms feed feature. Both edges of the pinfeed forms must be threaded.
- **Paper Specifications:** Maximum paper width is 381mm (15 in.); maximum pin-to-pin width for continuous forms is 368mm (14.5 in.); maximum print-line width is 335mm (13.2 in.).
- **Single Sheet Feed:** Single sheet feed is by manual insertion, unless the optional automatic cut sheet feed feature is used.
- **Automatic Cut Sheet Feed:** Optimum feeding results with the cut sheet feed will be obtained when using 75-90 gm/sq. metre (20-24 lb.) paper. Some 60 gm/sq. metre (16 lb.) paper may be used with satisfactory results. Users must test 60 gm/sq. metre (16 lb.) paper in their particular environment to assure satisfactory operating results.
- **Paper Recommendations:** The 5201 prints with a non-impact printing process which works best on smooth papers with a maximum roughness of 300 sheffield points (less the 9 BEKK second). Rougher papers should not be used. Most 60-75 gm/sq. metre (16-20 lb.) Xerographic papers meet this requirement.

A contrast control switch is available for customers to change the intensity of the printing to allow for changes in the paper, ribbons, or environment (e.g. humidity/temperature). See the "Guide-To-Operations" for additional details.

Listed below are only a few of many recommended papers:

- ARDOR(R) XEROCOPY (1)
- Champion(R) Bond (2)
- HAMMERMILL FORE(R) XEROCOPY (3)
- IBM MULTI-SYSTEM PAPER
- MEAD INFO XEROGRAPHIC
- NEKOOSA(R) BOND (4)
- SPRINGHILL(R) BUSINESS PAPER (5)

1. ARDOR is a registered trademark of Nekoosa Papers, Inc.
2. Champion is a registered trademark of Champion International Corporation.
3. HAMMERMILL FORE is a registered trademark of Hammermill Papers Group.
4. NEKOOSA is a registered trademark of Nekoosa Papers Inc.

MACHINES

5. SPRINGHILL is a registered trademark of International Paper Co.

- The Quietwriter Printers, with the new IBM Quiet Non-Correcting Ribbon (P/N 1299790), can print directly on transparencies. Transparency sheets should be manually inserted; with some transparencies a paper backing may be required for paper handling. Print on transparencies may not be indelible. Customers should test their preferred transparencies for suitability for their applications. Listed below are a few recommended transparencies:

- IBM Copy Transparency-Sheet, P/N 674107
- 3M Copy Economy Transparency Film for Infrared Copiers, Reorder Number: 78-6969-5495-3
- Overhead Transparency Film, P/N 9270-1128

Note: The previous IBM Quiet Non-Correcting Ribbon P/N 1299642, is not recommended for this application.

- See the "IBM Quietwriter Printer Guide to Operations" for limitations on reverse line feed. Reverse index is not recommended with continuous forms.
- The 5201 Model 2 attaches to the IBM Personal Computer via the IBM PC Printer Attachment Cable (P/N 1525612). This cable must be ordered separately by the customer.

The 5201 Model 2 attaches to the 3192 Model G or the 3979 Model 1 (when attached to the 3192 Model G only), via Printer Cable (P/N 6342058). This cable must be ordered separately by the customer.

Attachment of the 5201 Model 2 to other than IBM products may require a different printer attachment cable.

- Head Tilt - The Quietwriter Printer prints PC character graphics, character box by character box. This may possibly result in vertical bars not being exactly aligned.
- Considerations with graphic mode:

Vertical compression of up to 6 percent will be seen in the graphic output when using the Quietwriter Printer Model 2 as an IBM Graphics Printer.

Software graphics applications running on the IBM Graphics Printer may be incompatible with the Quietwriter Printer Model 2 due to the difference between the two printers index increment (1/216 in. on IBM Graphics Printer versus 1/96-inch on the Quietwriter).

A minimum dot pattern of 2 to 4 dots horizontally and 2 to 4 dots vertically may be needed to assure adequate print definition in certain applications. Certain APA graphics applications may significantly reduce ribbon yield.

Graphics requires two or three passes which results in using more ribbon per line than is used for text printing. Certain APA graphics applications may significantly reduce ribbon yield.

Customer Setup (CSU): The 5201-2 is designated a customer setup machine. Customer-setup instructions are shipped with the machine. The allowance is one day. Refer to GI section.

HIGHLIGHTS

- Letter Quality non-impact printing.
- Quiet (50 dB).
- All Points Addressable (APA) Capability.
 - Supports Graphics Commands of IBM Graphics Printer and IBM Proprinter
 - New high resolution graphics with up to 240 X 240 DPI addressability
- 40-60 cps burst print speed.

- Two on-line selectable type fonts; 252 characters per type font.
- Four pitches and multiple type styles including word processing type fonts.
- Ribbon: IBM Quiet Non-Correcting Ribbon (P/N 1299790).
 - New Indelible Ribbon cassette
 - Suitable for negotiable instruments and similar documents (Previous IBM Quiet Non-Correcting Ribbon - P/N 1299642, is not recommended for this application.)
 - High quality APA Graphics
 - Easy-to-install drop-in cassette
- Optional paper handlers include sheetfeed and continuous pinwheel form feeder.
- 335mm (13.2 in.) writing line.
- Program selectable vertical spacing in 1/96 (0.026cm) inches/lines increments.
- 216mm (8.5 in.) wide paper can be fed automatically with the cut sheet feed.
- 64mm (2.5 in.) to 381mm (14.5 in.) (pin-to-pin) paper can be fed with the continuous forms feed.
- 76mm to 381mm (3 in. to 5 in.) paper can be manually inserted.
- IBM Personal Computer Parallel Interface.

Physical Specifications:

Width: 541mm (21.3 in.)
Depth: 367mm (14.4 in.)
Height: 216mm (8.5 in.)
Weight: 22 lbs

Note: The Quietwriter Printer Model 2 conforms to U.P.S. shipping requirements.

Ordering: Model 2 (5201-2) has an IBM Personal Computer parallel interface.

Note: The 5201-2 is shipped with a printhead, a ribbon, a (Courier 10) PC type font, and an accessory kit.

The accessory kit contains the "Quietwriter Graphics Printer Guide-To-Operations", a line cord, a paper table, and the IBM Quiet Cleaning Cartridge.

For attachment to the 3197 Display Station Models C and D, see "Specify" section.

The 5201 Model 2 attaches to the IBM Personal Computer via the IBM PC Printer Attachment Cable (P/N 1525612). This cable must be ordered separately by the customer.

The 5201 Model 2 attaches to the 3192 Model G or the 3979 Model 1 (when attached to the 3192 Model G only), via Printer Cable (P/N 6342058). This cable must be ordered separately by the customer.

Attachment of the 5201 Model 2 to other than IBM products may require a different printer attachment cable.

Publications: "Guide to Operations" (5201)

	P/N
Canadian English	1341444
Canadian French	1341464
English (UK)	1341458
Finnish	1341463
French	1341459
German	1341460
Italian	1341462
Spanish	1341461

"Hardware Maintenance and Service Manual"

	P/N
Canadian French	1341472
English (UK)	1341466
French	1341467
German	1341470
Italian	1341468
Spanish	1341469

"Automatic Cut Sheet Feed Guide To Operations"

	P/N
Canadian French	6373115
English (UK)	6373325
Finnish	6373336
French	6373327
German	6373330
Italian	6373332
Spanish	6373334

"Automatic Cut Sheet Feed Hardware Maintenance and Service"

	P/N
Canadian French	6373116
English (UK)	6373326
French	6373329
German	6373331
Italian	6373333
Spanish	6373335

SPECIFY

- Cable Lengths (required to cable connect the Quietwriter Printer Model 2 to a Personal Computer). Cable length is 1.8m (6 ft.). Order P/N 1525612 for the IBM 5150 and 5160. To attach 3197 Display Station Models C and D, order P/N 6457008.
- Color: Single color only (no specify required).
- "Guide-To-Operations" Manual
- Language:

English #1341342
French #1341459
Spanish #1341461

- Type font type style: One Courier 10 PC reorder #1340810 is provided with the machine. Additional type fonts may be ordered as supplies by reorder number. See your Country DP Supplies Coordinator.

An IBM Quiet Electronic Font Type A(APG only>, H<) multi-lingual cartridge is required for attachment of the 5201 Quietwriter(R) Printer Model 2 to the 3192 Model Gs. These fonts are available in a variety of typestyles and pitches. Consult the "Supplies Reference Guide for Information Processing Equipment" (71K6162 or G570-2098).

SPECIAL FEATURES

PinWheel Form Feeder: (P/N 1341091); Feature #7820

Sheet Feed: (P/N 6373100); Feature #7840

MODEL CONVERSIONS

The Quietwriter Printer Model 1 is field upgradable to an Quietwriter Printer Model 2 by an IBM Service Repair Center or an Authorized IBM Dealer. Removed or replaced parts remain the property of the customer.

ACCESSORIES

Paper Tray: (P/N 8655073)(P/N 8655088) (Metric) Provides additional trays for Sheet Feed Paper Handler.

Cleaning Cartridge: The IBM Quiet Cleaning Cartridge (P/N 1299633).

Line Cord: P/N 1342514.

SUPPLIES

Ribbons: The IBM Quiet Non-Correcting Ribbon (P/N 1299790). An additional ribbon is needed to diagnose some problems. See your Country DP Supplies Coordinator.

Printhead: The IBM Quiet Printhead (P/N 1337488). An additional printhead is needed to diagnose some problems. See your Country DP Supplies Coordinator.

Type Fonts: None required with machine order. Additional type fonts are available in a variety of print styles, and character sets (see "Type Catalog"), and are interchangeable with the type font supplied with the machine. When ordering, consideration should be given to ordering a second identical type font for backup. Replacement and installation of the type font is the customer's responsibility. Contact IBM for ordering instructions.

PC TYPE FONT SUPPORT FOR IBM QUIETWRITER PRINTER

For the U.S., U.K., Germany, France, Italy, and Spain:

Prestige Elite	1340803
Gothic	1340824
Prestige 15	1340806
Boldface	1340830
Courier 12	1340815
Courier 15	1340819
Courier 10	1340810
Pica	1340834
Title	1340837

5202 QUIETWRITER(R) III PRINTER**PURPOSE**

The Quietwriter III Printer, is a high speed, executive letter quality printer for attachment to IBM Personal Computers and compatible non-IBM hosts. The Quietwriter III Printer offers the IBM Quietwriter Printer functions including all points addressable (APA) graphics. The Quietwriter III Printer offers higher speeds and enhanced functions over the IBM Quietwriter Printer and the IBM Quietwriter Printer Model 2. Depending on pitch, the Quietwriter III Printer will print at a burst speed of 100-171 cps in quality mode, a burst speed of 80-136 cps in enhanced mode, and a burst speed of 160-274 cps in draft mode. The enhanced functions increase font capability. Enhancements include:

- Up to eight fonts on-line
- Four embedded fonts
- Pluggable fixed font cartridges containing up to four fonts each (Optional)
- Pluggable downloadable font cartridge (Optional)

The Quietwriter III Printer features two optional sheetfeeds and an optional pinwheel form feeder. The user can, therefore, choose among manually fed cut sheets, continuous forms, or automatically fed cut sheets.

The Quietwriter III Printer attaches to the following IBM Personal Computers.

- Personal Computer (5150) Model 104, 166, 176, X66, X76
- Portable Personal Computer (5155) Model 66, 76
- PC Convertible (5140)
- Personal Computer XT (5160) Model 68, 78, 86, 87, 89, 268, 278, 468, 470, 478, 489
- Personal Computer XT Model 286 (5162) Model 286
- RT/PC (6150 and 6151) (4201 emulation support only)
- Personal Computer AT (5170) Models 68, 99, 239, 319, 339
- Personal Computer AT/370 (5170 Models 599, 739, 919, 939)
- PCjr (4860)
- 3270 Personal Computer (5271) (DOS 2.1/3.1/3.2; CP 1.2.2/2.1/3.0) Model 2, 4, 6, 24, 26 (See Note 1 below.)
- 3270 Personal Computer AT (5273) (DOS 3.1/3.2; CP 2.1/3.0) Model 20, 41, 42, 61, 62 (See Note 1 below.)
- 3270-PC/G and GX (5371) Model 12, 14, 16 (See Note 1 below.)
- 3270-PC AT/G and AT/GX (5373) Model 160, 161, 162, A60, A61, A62 (See Note 1 below.)
- IBM Personal System/2 Model 30 (8530)
- IBM Personal System/2 Model 50 (8550)
- IBM Personal System/2 Model 60 (8560)
- IBM Personal System/2 Model 80 (8580)
- Display - 3192 Model G (See Notes 2 and 4 below.)
- Display - 3197 Model C (See Notes 2 and 3 below.)
- Display - 3197 Model D (See Notes 2 and 3 below.)

Notes:

1. Customers should customize the 5202 as either a Quietwriter Printer 5201 or Proprinter 4201 for use with the 3270 PC Control Program, unless a release of the control Program subsequent to this notice states otherwise.
2. The IBM Quietwriter III Printer requires a IBM Electronic III cartridge in Code Page 850 when attached to the above displays. Switch number 1 of switch group 2 should be set ON in order to select the pluggable font.
3. Order printer cable P/N 6457008 for attachment. In the 3197 Model C and D off line printer set up mode, select Code Page 850. Switch number 1 of switch group 2 should be set to ON in order to select the pluggable font.
4. Order Printer Cable P/N 6342058 for attachment to the 3192 Model G.

MODELS**Model 1 001****Limitations:****1. Continuous Forms:**

It is not recommended to use continuous paper without the pin-wheel forms feed feature. Both edges of the pinfeed forms must be threaded.

Paper Specifications:

Maximum paper width is 420mm (16.54 inches). Maximum pin to pin width for continuous forms is 368mm (14.5 inches). Maximum print-line width is 335mm (13.2 inches).

2. Single Sheetfeed:

Single sheet is by manual insertion, unless the optional automatic cut sheet feed feature is used.

3. Automatic Cut Sheetfeed:

Optimum feeding results with the cut sheet feed will be obtained when using 20-24 pounds (75-90 gm/sq. meter) paper. Some 16 pound (60 gm/sq. meter) paper may be used with satisfactory results. Users must test 16 pound (60 gm/sq. meter) paper in their particular environment to assure satisfactory operating results.

4. Paper Recommendations

The 5202 prints with a non-impact printing process which works best on smooth papers with a maximum roughness of 300 sheffield points (less the 9 BEKK second). Enhanced mode should be used for rough papers. Most 16-20 pound (60-75 gm/sq. meter) xerographic papers meet this requirement.

The 5202 ribbon is sensitive to humidity and prints darker in high humidity and lighter in low humidity for a fixed setting of the print control. It therefore may be necessary to move the print control to a lower setting when the indoor humidity is high, and to a higher setting when the humidity is low. Lower temperatures require higher settings for a particular setting than higher temperatures. The ribbon is less sensitive to temperature variations.

Listed below are only a few of many recommended papers:

- ARDOR XEROCOPY (Trademark of Nekoosa Papers Inc.)
- CHAMPION BOND (Trademark of Champion International Corporation)
- HAMMERMILL FORE XEROCOPY (Trademark of Hammermill Papers Group)
- IBM MULTI-SYSTEM PAPER
- MEAD INFO XEROGRAPHIC
- NEKOOSA BOND (Trademark of Nekoosa Papers Inc.)
- SPRINGHILL BUSINESS PAPER (Trademark of International Paper Co.)

5. Transparencies

The Quietwriter III Printer may be used to print directly on transparencies. Print quality and durability depend on the transparency used. Therefore, transparencies should be tested for acceptability.

Several considerations for printing on transparencies are:

- Transparencies produced for use with infrared copiers generally give acceptable results when printing is done on the front or non-infrared side. In general the front of the transparency is identified by placing the "notch" in the transparency in the upper right-hand corner or as recommended by the individual manufacturer.

- A sheet of xerographic paper should be loaded behind each transparency.
- Use the Quality print mode.
- Information printed on the transparency is not indelible.

Listed below are three transparencies which have been tested with the printer. However, since changes in the design or manufacture of these transparencies by the manufacturer cannot be anticipated by IBM, these transparencies should be tested for acceptable results with your application.

- 3M, Scotch (Trademark of 3M) 7100, Transparency Film for Infrared Copiers, D.C./Part No. 021200-16819
- 3M, 1301, Transparency Film for Overhead Projection, Infrared Transparency Film, Reorder Number 78-6969-5495-3
- Labelon Corporation, TR-45, Projection Transparencies-Infrared, Order Number TR-45C.

Other transparencies may provide acceptable results for your application. However, they should also be tested.

6. Attach to: Other than IBM products may require other than the IBM PC printer cable.
7. US Support Attachment to the 3192 Model G, 3197 Model C, and 3197 Model D requires an IBM Electronic Font III cartridge in Code Page 850. Hex Trace Dump is inoperable when the 5202 is connected to the 3197 Models C and D.
8. World Trade Support Attachment to the 3192 Model G, 3197 Model C, and 3197 Model D requires an IBM Electronic Font III cartridge in the appropriate language cartridge.

Language	ASCII Code	Page
Arabic	864	
Cyrillic	855	
Greek	851	
Hebrew	862	
Latin2/Yugoslavian	852	
Turkish	853	
All other western Europe	850	

Code page 437 is not supported by the above displays for the 5202.

9. Usage Considerations - Expected average annual usage is 6 million characters. Care should be exercised in placing the printer in usage environments exceeding 12 million characters a year due to supply cost considerations.
10. Head Tilt - The Quietwriter III Printer prints graphics, character box by character box. This may result in vertical bars not being exactly aligned.
11. Minimum dot density is 2 x 2 when in 240 x 240 dots per inch APA graphics mode.

Prerequisites: An adapter kit must be ordered and installed on the Quietwriter III Printer in order to use the Single Drawer Automatic Cut Sheet Feed Option (P/N 6373100).

DisplayWrite Users - For DisplayWrite Assistant, DisplayWrite 3 Version 1.1 and DisplayWrite 4 users a printer support table is required and is available as a no charge feature. The printer support diskette should be ordered at the time the printer is ordered.

Printer Support Diskette	Feature Number	P/N
3.5-inch Diskette	8632	1318632
5.25-inch Diskette	8629	1318629

Customer Setup (CSU): Yes. IBM set up is available at the applicable IBM hourly service rates and minimum charges.

For additional information on CSU, contact IBM.

HIGHLIGHTS

- Quiet (45 dBA when printing)
- Quality non-impact printing
- High Resolution All Points Addressable (APA) graphics
- 100-171 cps burst print speed (quality mode)
- 160-274 cps burst print speed (draft mode)
- 80-136 cps burst print speed (enhanced mode)
- Up to 252 Characters per font
- Up to 8 fonts on-line
- Five pitches and multiple type styles
- New high yield printer ribbon
- Optional paper handlers for cut sheet and continuous forms
- 335mm (13.2-inch) writing line
- IBM PC parallel interface
- National Language Support
- Suitable for Shipment by common carrier (e.g. U.P.S.)

DESCRIPTION

The Quietwriter III Printer is a new member of the resistive ribbon family and attaches to the IBM Personal Computers and to Non-IBM Personal Computers compatible with the IBM Personal Computer Parallel Interface. The Printer offers three software or operator selectable burst print speeds of 80-136 cps, 100-171 cps, and 160-274 cps depending upon which print mode and pitch is selected. The quality mode provides engraved letter quality printing for external correspondence and whenever high quality printing is required. The enhanced mode is used to help to maintain high quality printing under special conditions such as high humidity or with textured papers. The high speed draft mode provides suitable quality and faster speed for internal correspondence and utility applications. There are four fonts of various pitches embedded in the printer (Courier 10, 12, 17.1 and Boldface PS). To supplement this choice of typestyles, there are additional IBM ELECTRONIC Fonts III available. APA graphics support will enable the Quietwriter III Printer to print graphics output from the IBM Personal Computer. It will support the graphics commands that currently operate the 5152 Graphics Printer and the 4201 Proprinter and will operate with the addressability of the 5152 (72X60, 72X120, 72X240) (dots per inch vertical by horizontal). In addition, the three new addressing modes of the IBM Quietwriter Printer Model 2 (60 x 60, 120 x 120, 240 x 240) will be provided to allow high resolution printer graphics. Graphics and text modes may be alternately used in the same document.

The Quietwriter III Printer attaches to the IBM Personal computer via the IBM PC Printer attach cable. Attachment to other than the IBM Personal Computer may require a different cable.

Three optional customer set-up paper handling features are offered for the printer. These options are:

- A Dual Drawer Sheetfeed with an optional Envelope feature.
- The Single Drawer IBM Quietwriter Sheetfeed
- A continuous forms feed.

The Font Download Feature is an option for the IBM Quietwriter III Printer which consists of the Download Cartridge (16K), a pluggable 16K memory cartridge, two 5.25-inch diskettes containing up to 14 unique fonts, and one 3.5-inch diskette containing up to 28 unique fonts. These features consist of a Guide-to-Operations and a diskette (or diskettes) containing data for various fonts along with the instructions which will allow the user to load a specifically selected font into the Download Cartridge (16K). Some versions of the Font Download Feature will not have the Download Cartridge (16K). These options offer additional font, language and code page support not available in the IBM ELECTRONIC FONT III cartridges.

IBM Download Cartridge (16K): The IBM Download Cartridge (16K), P/N 1318800, is common worldwide. Each 16K cartridge is capable of storing one 252 character font.

The IBM Download Cartridge (16K) is also available separately and will be distributed as a supply item in the US, as are the IBM ELECTRONIC FONT III cartridges.

Font Download Feature Diskettes: Each 5.25-inch diskette will contain the download utility program and up to 14 font data files. Each 3.5-inch diskette will contain the download utility program and up to 28 font data files. All diskettes will be double sided, supporting DOS levels 2.0 and higher and 3.5-inch supporting DOS levels 3.2 and higher. Font Download Feature Diskettes require the optional IBM Download Cartridge (16K).

Download Fonts for the Quietwriter III Printer

IBM PC Canadian French Character Set

Code Page	P/N	No. Fonts	No. Diskettes
863	1318469	14	1 - 5.25-inch and 1 - 3.5-inch
	1318601 w/o IBM Download Font Cartridge (16K)		

Fonts:

Artisan 10	Gothic 17
Boldface PS	Letter Gothic 12
Courier 10	Modern PS
Courier 12	Prestige Pica 10
Courier 12 Italic	Prestige Elite 12
Courier 15	Prestige 17
Courier 17	Title PS

Publications

SPECIFY

- Voltage (90-137V AC, 1-phase, 50/60 Hz; (Australia 180-259V AC, 1 phase 50/60 Hz). No specify required).
- Cable Lengths (required to cable connect the Quietwriter III Printer to a Personal Computer). Cable length is 1.8m (6 ft). Order P/N 1525612 for the 5150 and 5160.
- Color: Single color only (no specify required).
- Guide-to-Operations Manual

SPECIAL FEATURES

Feature	P/N	Feature Code
Pinwheel		
Form Feed	1318214	#8214
Dual Drawer		
Sheetfeed	1479538	#9538
(with Envelope option	1479620	#9620
Sheetfeed	6373100	#7840
IBM PC Printer		
Attach Cable	1525612	#5612
Font Download Feature:		
IBM PC		
Multilingual	1318659	#8659
IBM PC		
Multilingual without		
IBM Download		
Cartridge-16K	1318670	#8670
IBM Word-		

processing	1318459	#8459
IBM Word-		
processing		
without		
IBM Download		
Cartridge-16K	1318570	#8570
Canadian		
French	1318469	#8469
Canadian		
French		
without		
IBM Download		
Cartridge-16K	1318601	#8601

Cables: A PC Printer Attach Cable (P/N 1525612) must be ordered separately to attach the Quietwriter III Printer to the parallel interface of the Personal Computer.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

Ribbons: The IBM Quiet(R) III High Yield Printer Ribbon (1299933). An additional ribbon is needed to diagnose some problems. See your Country Supplies Coordinator. Contact IBM.

Printhead: The IBM Quiet III Printhead (1318154). An additional printhead is needed to diagnose some problems. See your Country Supplies Coordinator. Contact IBM.

IBM Downloadable Cartridge (16K): None required with machine order (P/N 1318800).

IBM Electronic Font III: None required with machine order. Additional type fonts are available in a variety of print styles, and character sets.

When ordering, consideration should be given to ordering a second identical type font for backup. Replacement and installation of the type font is the customer's responsibility. Contact IBM for ordering information.

Part Numbers for Machines/Features/Supplies

Machines

Description	P/N
IBM Quietwriter III Printer (5202-001)	
Low Voltage (90- 137V AC 50/60 Hz)	1318455 (see note)
High Voltage (180- 259V AC 50/60 Hz)	1318456 (see note)

Note: Country order code will determine voltage shipped.

Features

	P/N	Feature Code
IBM PC Printer		
Attach Cable	1525612	#5612
Automatic Dual		
Drawer Sheetfeed	1479538	#9538
Envelope Feed		
(P/N 1479538		

MACHINES

M 5202.4
APR 87
NEW

is a prerequisite) 1479620	#9620
Automatic Single (US)	
Drawer Sheetfeed	
(P/N 1318362 is	
a prerequisite) 6373100	#3100
Auto Single	
Drawer S/F	
Attachment Kit 1318362	#8362
Automatic Single	
Drawer Sheetfeed	
(WT) (Includes the	
A4 metric paper	
tray) (P/N 1318503	
is a prerequisite) 6373101	#3101
Auto Single	
Drawer S/F	
Attachment Kit(WT) 1318503	#8503
Pinwheel Forms	
Feed 1318214	#8214
Font Download Feature:	
IBM PC	
Multilingual 1318659	#8659
IBM PC	
Multilingual	
without	
IBM Download	
Cartridge-16K 1318670	#8670
IBM Word-	
processing 1318459	#8459
IBM Word-	
processing	
without	
IBM Download	
Cartridge-16K 1318570	#8570
Canadian French 1318469	#8469
Canadian French	
without IBM	
Download Cartridge	
-16K 1318601	#8601
Supplies	
IBM Quiet(R) III	
High Yield Printer	
Ribbon 1299933	
IBM Download	
Font Cartridge 1318800	
IBM Quiet(R)	
Printhead 1318154	

IBM ELECTRONIC Font III cartridges

P/N	Code Page	Type Style Code	Type Styles	Language/Country
1318010	437	013	Artisan 10	
		087	Letter	
		255	Gothic 12	
		157	Gothic 17	
1318020	437	018	Title PS	
		092	Courier 10	
		092	Italic	
		092	Courier 12	
		084	Italic	
		155	Script 12	
		155	Boldface	
		155	Italic PS	
1318030	437	012	Prestige	
		086	Pica 10	
		086	Prestige	
		256	Elite 12	
		158	Prestige 17	
1318040	850	013	Modern PS	
		087	Artisan 10	
		087	Letter Gothic	
		255	Gothic 17	
		157	Title PS	
1318050	850	011	Courier 10	
		085	Courier 12	
		254	Courier 17	
		159	Boldface PS	
1318060	850	012	Prestige	
		086	Pica 10	
		086	Prestige	
		256	Elite12	
		158	Prestige 17	
1318830	863	011	Modern PS	
		011	Courier 10	Canadian French
		085	Courier 12	
		254	Courier 17	
		159	Boldface PS	
1318860	911	021	Katakana 10	Japan
	911	078	Katakana 12	
	911	249	Katakana 17	
	850	087	Letter	
			Gothic 12	

5208 MODEL 1 ASCII-5250 LINK PROTOCOL CONVERTER

PURPOSE

The 5208 allows ASCII displays, PCs emulating ASCII displays, and ASCII printers to attach to a System/36, System/38, or 5294 Remote Control Unit as twinaxially-attached 5250 devices. (See device information in "Description" below.) Each twinaxially-attached 5208 may connect up to 7 ASCII devices. ASCII devices are attached locally via RS-422-A or locally and/or remotely via RS-232-C connection. An IBM parallel printer interface is also available on each 5208.

MODELS

Model 001

Limitations:

- A 5208 attached device cannot display or print Business Graphics Utility or GDDM graphical output from the System/36 or System/38.
- The keyboards supported by the ASCII/Async family of displays are different from the 5250 family. Mappings may not be one-for-one. There may be, for example, additional key-strokes to accomplish the same function.
- ASCII devices may not be capable of displaying/printing all possible 5250 characters.
- Characters printed on the ASCII/Async printers may differ in appearance (size, shape, color) from the same data printed on the equivalent 5250 printer. This may cause, for example, preprinted forms to be incompatible.
- The 5208 does not have cable-through and therefore must be the last device on the twinaxial port. Attaching other 5250 devices on the same port will reduce the number of devices which can be supported by the 5208.
- In order to facilitate service, it is recommended the system console be within 6 meters (20 feet) of the System Unit and be attached via direct connection.
- The Organizer functions of PC Support/36 are not available through Dial/3X.
- IBM serial cables attaching ASCII printers to IBM PCs will not attach to the 5208. See the "5208 User's Guide" for cable specifications.

Prerequisites:

- An available twinaxial port on the System/36, System/38, 5294 Remote Control Unit, or a cable-through connection on an existing device.
- A supported display on any 5208 port if customization is to be keyed into the 5208.
- 5208 cables must meet the specifications documented in the "5208 User's Guide" to meet electromagnetic emission standards.

Customer Setup (CSU): Yes.

HIGHLIGHTS

- Up to 7 ASCII devices per 5208.
- Auxiliary printer supported.
- ASCII devices locally or remotely attached:
 - Switched or nonswitched lines

- Auto-answer modems
- Switched line timeout

- Automatic speed and parity recognition.
- Existing terminal wiring may be utilized in many cases.
- User-modifiable keyboard/character/attribute mappings.
- PCs attached remotely or locally.
- 5250 application access including DisplayWrite/36, Personal Services/36, Personal Services/38.

Physical Specifications:

- Weight: 5.9kg (13 lbs) plus cable
- Height: 109.2mm (4.3 in.)
- Width: 424.2mm (16.7 in.)
- Depth: 327.7mm (12.9 in.)
- The 5208 is designed to work in a typical office environment with no air conditioning and with normal heating and normal venting.
- Power Requirements: 90-137V AC or 180-259V AC at 50 or 60 Hz.

Operating Environment: Release 5 IBM System/36 SSP or later compatible releases on the IBM System/36 and Release 8 IBM System/38 CPF or later compatible releases for the IBM System/38 have been tested and will be supported.

Publications:

- SA21-9870 IBM 5208 ASCII-5250 Link Protocol Converter User's Guide
- SY31-0678 IBM 5208 ASCII-5250 Link Protocol Converter Maintenance Information and Parts Catalog Manual

DESCRIPTION

ASCII Device Support: Each 5208 allows up to 7 ASCII displays, PCs emulating ASCII displays, and ASCII printers to attach to a System/36, System/38, or 5294 Remote Control Unit as twinaxially-attached 5250 devices. A 3151, 3161, (Canada only > 3162, <) 3163, or 3164 can act as the System/36 (5360 or 5362) system console. An IBM ASCII printer can act as the system printer.

The following displays have keyboard mappings predefined on the 5208:

DISPLAY	EMULATED DEVICE
3101-23	5291
3151-11x, 31x, 41x	5291
3161	5291
(Canada only>	
3162	3180-2<)
3163	5291
3164	5292-1
ADDS Viewpoint	
A2 (R)	5291
Esprit II (TM)	5291
Lear Siegler	
ADM 3A,	
ADM 5 (R)	5291
TeleVideo (R)	
905,910,925, 950, 955	5291
DEC (R) VT-100, VT-220	5291
Wyse (R) WY30,	

WY50

5291

Note: Also included in the above listing, Personal Computers Emulating a Supported Display, 5291/5292-1

- Viewpoint is a registered trademark of Applied Digital Data Systems, Inc.
- DEC is a registered trademark of Digital Equipment Corporation.
- Esprit II is a trademark of Esprit Systems, Inc.
- TeleVideo is a registered trademark of TeleVideo Systems, Inc.
- Wyse is a registered trademark and WY30 and WY50 are trademarks of Wyse Technology.
- Dumb Terminal (Lear Siegler ADM 5 and ADM 3A) is a registered trademark of Lear Siegler, Inc.

The 5208 supports the following multilingual keyboard/character sets on the 316X and 3151 displays. The character sets are based on ISO standard 8859: Spanish, UK English, Italian, French, German, Canadian French, Belgian, Danish, Finnish, Swedish, Norwegian, Portuguese, Swiss French, Swiss German. Of the above keyboards/character sets, the 3163 and 3164 do not offer ISO 8859 support of Spanish, UK English, Italian, French, German, and Canadian French. For these 3163 and 3164 keyboard/character sets, the 5208 supports the national character set code page. ISO 8859 support for French, German, Italian, Spanish, and UK English requires a corresponding 3161 feature. Predefined keyboard mappings for the IBM 3101-23 and non-IBM displays are US English only. See the following information on secondary mapping.

The following ASCII printers are supported:

PRINTER	EMULATED DEVICE
Proprinter(TM) 4201-1, 4201-2	5219-D02
Proprinter XL 4202	5219-D02
Proprinter X24 4207 supported as 4201-1	5219-D02
Proprinter XL24 4208 supported as 4202	5219-D02
Quietwriter(R) 5201	5219-D02
Quietwriter III 5202 supports drawers/envelopes	5219-D02
Wheelprinter(TM) 5216-2, 5223	5219-D02

Other ASCII printers that attach by RS-232-C, RS-422-A, or IBM parallel interface are presented a set of 3 commands (Carriage Return, New Line, and Bell) that allow these printers to emulate the 5256-3 printer. The following non-IBM printers have been tested and found to work with the 5208. See the "User's Guide" for more information.

- Genicom 3184
- Epson FX100
- NEC 3510, 8850
- TI Omni (R) 800 Model 810

Omni 800 is a registered trademark of Texas Instruments, Inc.

Auxiliary Printer Support: The 3151, 3161, (Canada only > 3162, <) 3163, and 3164 provide an auxiliary port capability. This capability allows another ASCII device to be attached to the 3151 and 316X displays through a serial connection. This is conceptually similar to the System/36 and System/38 cable-through capability. The 5208 supports the attachment of a printer attached to a 3151 or 316X auxiliary port. This auxiliary printer is available to the System/36 or System/38 as a workstation printer. 2 of the 7 possible 5208

ports/addresses are utilized for each display/auxiliary printer combination configured in the 5208.

ASCII Attachment Interfaces: Either RS-232-C (CCITT V.24/V.28) or RS-422-A (CCITT V.11) interfaces are supported from any of the 7 ports. The RS-422-A interface allows local attachment of devices (up to 1,200 meters or 4,000 feet away). The RS-232-C interface allows either local (up to 15 meters or 50 feet away) or remote (through modems) attachment and provides a low-cost method of attaching displays and auxiliary printers. Displays (or devices emulating them) are supported through point-to-point asynchronous modems. The modems may be switched or nonswitched.

The following IBM modems are supported:

- 5811-20 Modem (asynchronous mode)
- 5812-10 Modem (asynchronous mode)
- 5841 Modem (asynchronous mode)
- 5842 Modem (asynchronous mode)
- 5140 PC Convertible Internal and Enhanced Internal Modem

The following non-IBM modems have been tested and found to work with the 5208:

- Hayes (R) Smartmodem 1200 (TM) and Smartmodem 2400 (TM) (asynchronous mode)
- Concord 224 (R)
- Racal-Vadic 2400

Hayes is a registered trademark and Smartmodem 1200 and Smartmodem 2400 are trademarks of Hayes Microcomputer Products, Inc.

Concord 224 is a registered trademark of Concord Data Systems, Inc.

The 5208 will disconnect ("hang up") a line that has been inactive for a specified period of time. This time period is specified in the customization process.

Rated Speed and Parity: Among the features supported by the 5208 are bps rates of 110 to 19,200 bps; 7 or 8 data bits; 1 or 2 stop bits; and odd, even, space, mark, or no-parity. The 5208 can automatically recognize rate and parity for displays operating at 300 to 9600 bps. 7-bit displays must not use "no-parity" and 8-bit displays must use "no-parity" for auto recognition to work. See the "5208 User's Guide" for more details.

Wiring: Existing ASCII terminal wiring may be used if it meets the requirements shown in the "User's Guide". Six of the 5208 ASCII ports support a serial asynchronous interface only. The seventh port is either a serial asynchronous or an IBM parallel printer interface. The 5208 is directly attached to the System/36, System/38, or 5294 Remote Control Unit via a twinaxial connection or IBM Cabling System. The 5208 requires a Twinaxial Impedance Matching Device to attach to the IBM Cabling System.

Most IBM cables attaching ASCII devices will work with the 5208. However, serial cables designed to attach ASCII printers to IBM PCs will not attach to the 5208.

Device Configuration: The 5208 is shipped with a default configuration of 7 displays. Modems and printers must be defined by the user through a series of prompted menus stored in the 5208. Displays may be configured also.

If a 5208 port is not configured as a specific display type, the user will select the display type each time he signs on. After the user selects a display type from a 5208 menu, the System/3X sign-on screen is displayed, initiating the System/3X session. Combined with automatic speed and parity recognition, this gives the 5208 additional flexibility. The 5208 port must be configured on the System/3X as a 5291, (Canada only > 5292, or 3180 <) (Except Canada > or 5292 <) terminal before using this feature.

Secondary Mapping: The 5208 has predefined default keyboard/character mappings. These default mappings will satisfy most customers. For users with specialized needs, the 5208 is very flexible. Keyboard, characters, and attributes can be configured by

the user. These alternate mappings are then stored in non-volatile memory.

Experienced users may choose to download a customized 5208 configuration from the System/36 or System/38. The user must provide System/36 or System/38 code. Refer to the "5208 User's Guide" for details. The ability to download the configuration records will allow central support and customization for converters throughout the network.

PC Attachment: PCs may be remotely or locally attached by an asynchronous (serial) port. IBM PCs include the Personal System/2(TM), Convertible, AT(R), XT(TM), and original PC.

PCs attached to the 5208 must emulate a supported display (and optionally an auxiliary printer). The 3101 Emulation Program (6024042) has been tested and found to work as the supported 3101 display. The Interactive Asynchronous Terminal Emulation-Dial/3X PRPQ (P84111) allows the PC to utilize the 3161 protocol with extensions designed for the 5208/5250 environment. Dial/3X also allows access to PC Support/36 and PC Support/38, supports an auxiliary printer, and provides facilities for further user interface enhancements. All features of PC Support/36-38, except the Organizer feature, are available. Functions include virtual disk, virtual printer, PC Transfer Facility (including API), and shared folders. See the RPO data base under HONE for more Dial/3X information and availability information.

Virtual Printer Support: The enhanced virtual printer support of PC Support/3X allows PCs to direct output to ASCII printers without transformation. The 5208 supports this capability by passing the data stream to a PC printer connected to the 5208. Printers attached to PCs connected to a 5208 via Dial/3X's auxiliary printer capability may also be addressed.

Non-IBM Devices: The "5208 User's Guide" lists the ASCII displays which have predefined mappings and displays which are supported. Users should compare their non-IBM ASCII displays to this list to determine if their specific type, model, level, or attachment method are supported. Other displays not listed may work if they emulate a display which is listed. Users are responsible for determining if the untested display will work to their satisfaction. Users are also responsible for determining if non-IBM printers and modems will work to the user's satisfaction with the 5208's printer interface and modem interface.

Performance: ASCII devices attached to the 5208 will not provide the same response time as local twinaxially-attached 5250 terminals. This is due to the ASCII devices' speed, 110 to 19,200 bps. However, the 5208's architecture partially compensates for the ASCII device's speed by minimizing data traffic. For estimating purposes, ASCII response time performance should be comparable to performance by communicating 5250 devices running at the same line speed.

The 5208 ASCII-5250 Link Protocol Converter only has US English customization screens. The "User's Guide" is translated into Spanish or German to interpret these screens. All System/36 and System/38 keyboard and character set mappings are supported for 5250 applications except Kanji and Katakana provided the character is available on the display or printer. Double-byte terminals are not supported. Dial/3X is US English only.

SPECIFY

- The default publication language is English. If Spanish or German is required, specify: #9002 for German, #9003 for Spanish.
- The power cord shipped with the 5208 will be determined by the country to which the 5208 is shipped.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Modem Cable (P/N 69X7016): A modem cable can be ordered for attaching a modem to the 5208.

SUPPLIES (NONE)

5209 LINK PROTOCOL CONVERTER

PURPOSE

The 5209 Mdl 1 allows 3270 devices to be attached to a S/36 or S/38, either locally or remotely (via the 5294 Remote Control Unit) and concurrently to a S/370 host through a 3174/3274 Control Unit. (See device information in "Description" below.) The end user can "hot key" ("jump") between active display sessions on the S/36 or S/38 and the S/370 host. 3270 printers may be interactively assigned to either a 5250 or 3270 session. Users have full access to DisplayWrite/36, Personal Services/36, and Personal Services/38. Installed 3270 users can access S/36 or S/38 applications and S/370 applications from a single work station.

MODELS

Model 1 001

Limitations

- Data Entry, Text, and RPQ keyboards are not supported for 5250 applications.
- Multiple session or DFT devices (ie, 3290, 3179-E, 3179-G, 3193, 3270-PC/G, 3270-PC/GX) are not supported for 5250 applications. The 3270-PC is supported as a single ("CUT") session device only.
- S/370 graphics are not available on the 3270-PC while in "CUT" mode.
- 3270 displays cannot display or print Business Graphic Utilities or GDDM graphical output from the S/36 and S/38.
- PC Support/36 and PC Support/38 are not available to the 3270-PC or IBM Personal Computer with 3278/79 emulation cards.
- The 5209 Mdl 1 does not have twinaxial cable-through and therefore must be the last device on a S/36 or S/38 port. Devices other than the 5209 Mdl 1 may be on the same port, but they reduce the number of devices the 5209 Mdl 1 can support.
- For service by IBM NSD service personnel, the system console must be within 20 ft. of the system unit.
- 3278/3279 emulation programs do not pass all keystroke information to the 5209 and therefore have limited capabilities. A secondary keyboard mapping on the 5209 may restore some or all of these capabilities.
- The 5209 Mdl 1 cannot be attached to a 3274-51C because the 3274-51C does not support the 3299 Terminal Multiplexor.

Prerequisites

- An available twinaxial port on the S/36, S/38, or 5294 Remote Control Unit or a cable-through connection on an existing device
- A supported display on Port 0 if configuration is required
- The 5209 Mdl 1 appears to the 3174/3274 Control Unit to be a 3299 Terminal Multiplexor. The customer, therefore, needs to verify that any 3274 to which the 5209 Mdl 1 will be attached is properly featured to support a 3299. (All 3274 models except the 3274 Mdl 51C can support the 3299 Terminal Multiplexor with appropriate features.) For 3274 field upgrades, see RPQs 8K1156, 8K1180, 8K1182, and 8K1194. The 3174 attaches the 3299 natively.
- The 5294 Remote Control Unit must have #3630 if the IBM Enhanced (102-key) keyboard is used through a 5294-attached 5209
- If the IBM Enhanced (102-key) keyboard is used and if attached to a S/38, the 5209 must attach to a S/38 extended work station controller (WSCE).
- The 3174 Control Unit requires a standard, no-charge RPQ #8K1387 in order to attach a 5209. (AG only> (This RPQ is

mutually exclusive with the 3174 ASCII Emulation Adapter Feature, #3020). <.)

- A very small, no-charge software patch is required on the 3270-PC Control Program. The patch is provided in the 5209 User's Guide for both Release 2.1 and 3.0.

Customer Setup (CSU): Yes.

HIGHLIGHTS

- Up to seven 3270 devices attach concurrently to a S/36, S/38, or 5294 Remote Control Unit and a 3174/3274 per 5209 Mdl 1.
- "Hot key" ("jump") between two concurrent sessions (one session through a 3174/3274 on an S/370 and one on the S/36 or S/38)
- 3270 printers interactively assigned to either a 5250 or 3270 session
- Full 3270 capabilities and ergonomics maintained when in session with a S/370 via a 3174/3274
- Existing 3270 terminal cabling utilized
- Automatic device recognition
- User modifiable keyboard mapping
- 5250 application access includes DisplayWrite/36, Personal Services/36, and Personal Services/38.

Physical Specifications

- Weight - 11.4kg (25 lbs) plus cable
- Height - 133.4mm (5.25 in)
- Width - 445mm (17.5 in)
- Depth - 566mm (22.3 in)
- The 5209 Mdl 1 is designed to work in a typical office environment with no air conditioning and with normal heating and normal venting.
- Power Requirements: 90 to 140V AC or 180 to 265V AC, 49 to 62 Hz.

Operating Environment: Release 5 System/36 SSP or later compatible releases on the S/36 and Release 8 System/38 CPF or later compatible releases for the S/38 have been tested and will be supported.

Publications

- "IBM 5209-001 3270-5250 Link Protocol Converter User's Guide", SA21-9869
- "IBM 5209-001 3270-5250 Link Protocol Converter Maintenance Information and Parts Catalog Manual", SY31-0679

DESCRIPTION

3270 Attachment: The 5209 Mdl 1 3270-5250 Link Protocol Converter allows up to seven 3270 devices to concurrently access S/36 or S/38 applications and S/370 applications. Attachable 3270 devices include displays, printers, 3270-PCs, and PCs with 3278/79 emulation cards.

The 5209 Mdl 1 provides one upstream twinaxial connection to a S/36, S/38, or 5294 control unit, one upstream co-axial connection to a 3174/3274, and seven downstream co-axial connections to 3270 terminals. It is not necessary for both upstream connections to be operational.

The following displays are supported:

3270	Model	Emulated 5250 Device
3178	C2, C3, C4	3196-A10, B10
3179	1	3197-C10
3180	1	3197-D10
3191	A10, B10,	

3191	A30,B30	3196-A10,B10
3192	A20,B20	3196-A20,B20
3192	D20	3197-D20
3192	C10,C30	3197-C10
3192	C20	3197-C20
3192	D10,D30	3197-D10
3278	2,3,4	3196-A10,B10
3278	5	3197-D10
3279	S2A,2A,3A	*3196-A10,B10
3279	S2B,S3G, 2B,3B	3197-C10
3279	2X,3X	*3196-A10,B10 (3197-C10 w/extended function feature)

3270-PC
in "CUT"
mode
IBM PC
with
3278/79
card
*3196-A10,B10
5292 (color)

* 3196 emulation provides only two colors for 5250 application display screens on 3270 color displays.

The following keyboards are supported:

75-Key Typewriter	(3278, 3279)
87-Key Typewriter	(3278, 3279, 3178)
87-Key Attribute Select	(3278, 3279)
87-Key Typewriter/APL	(3278, 3279)
87-Key Attribute Select/APL	(3278, 3279)
122-Key IBM Enhanced	(3191,3192)
122-Key Typewriter	(3179, 3180, 3191,3192)
122-Key Typewriter/APL	(3179, 3180)

Data Entry, Text, and RPQ keyboards are not supported for 5250 applications.

The following keyboards/character sets are supported:

Austria/Germany
Belgium
Canadian French
Denmark (Denmark/Norway Character Set)
Finland (Finland/Sweden Character Set)
French (AZERTY)
French (QWERTY)
International (Multinational Character Set)
Italy
Norway (Denmark/Norway Character Set)
Portugal
Spain
Spanish (Spanish Speaking Character Set)
Sweden (Finland/Sweden Character Set)
Swiss-French (Multinational Character Set)
Swiss-German (Multinational Character Set)
UK

The following SNA Character String (SCS) printers are supported:

3270	Model	Emulated 5250 Device
3262	3,13	5256-3
3268	2,2C	5256-3 (one color)

3287*	1,2,1C,2C	5256-3 (one color)
4224**	201,202, 2E2,2C2	4224-101,102,1E2, 1C2
4234	1	5256-3
4245	D12,D20	5256-3
5210	G1,G2	5219-D1,D2

* Some 3287 printers may not have the no-charge SCS feature installed.

** 4224 Printers must have EC A21635 installed and 4214 Model 1 emulated as 5256-3.

Hot Key Support: A 3270 display user may "hot key" ("jump") between a 5250 and a 3270 session at any time using a two-keystroke sequence. Neither session will be disrupted. The 5209 Mdl 1 presents display information to both upstream control units indicating that the display is still logically attached. The 5209 does not prevent its upstream control units from maintaining additional host sessions.

Printer Support: Printers may be interactively assigned to either a 5250 or 3270 session. Any display on the same 5209 Mdl 1 may reassign the printer. The 3270 printer may be the system printer for the S/36 and S/38. To the host system to which the printer has just been assigned, the printer appears to have been powered on. To the host system to which the printer had been assigned, the printer appears to have been powered off.

3270 Capabilities: The S/370 applications and 3270 ergonomics are not affected by the 5209 Mdl 1. Full 3270 capabilities are preserved when in session with the S/370 via the 3174/3274. For example, DFT sessions, extended data stream, programmable symbol sets, magnetic slot reader feature, magnetic scanner feature, or selector light-pens will work for S/370 applications. However, these functions are not available for a 5250 session.

Any supported 3270 display that has the extended highlighting feature may be the system console for the IBM System/36 (5360 and 5362 system units). Extended highlighting is standard on the 3179, 3180, 3192, and 3279-S2B, S3G and available as a feature on the 3278 and 3279.

The shadow cursor function used by DisplayWrite/36 is shown on any display which has the extended highlighting. A message line identical to the message line used by the 3180-2 is also provided for the 3180-1 and 3192-D10, D20, D30 for 5250 applications.

Cabling: Because the 5209 Mdl 1 functions essentially as a 3299 Terminal Multiplexor, 3270 cabling is preserved. The 5209's coaxial connections are Dual Purpose Connections allowing direct attachment of either coaxial cable or the IBM Cabling System. The coaxial Balun Assembly is not required for the 5209's attachment to the IBM Cabling System.

One additional twinaxial cable for the S/36, S/38, or 5294 Remote Control Unit is required. The Twinaxial Impedance Matching Device is required for the 5209's attachment to the IBM Cabling System.

Automatic Device Recognition: The 5209 Mdl 1 automatically identifies the 3270 display and printer types that are attached. No additional configuration procedures may be required.

Keyboard Mapping: Default keyboard mappings are provided. An alternate keyboard mapping may be selected or created through an easy-to-use, prompted configuration procedure using a display on Port 0. The configuration is stored in nonvolatile memory.

The 3178-C3 and 3178-C4 are configured in the 3174/3274 Control Units as having RPQ 3270 keyboard definitions. The IBM 5209 does not support RPQ keyboards with a default keyboard mapping. The customer must create a secondary keyboard mapping in the 5209 to match the 3178-C3/C4's keyboard. See the 5209 User's Guide for a 3178 secondary mapping example.

IBM PC 3270 Emulation: The 5209 interfaces with the 3278/79 emulation software products running on the IBM PC or 3270-PC in CUT mode. Many of these products do not pass enough keystroke infor-

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mation to the 5209 to offer full 5209 function (for example, the key-stroke sequences needed by the 5209 to hot key between S/370 and S/36-S/38 systems or configure the 5209). Customers should refer to their emulation software documentation to determine what key-stroke information will be passed upstream. A secondary keyboard mapping in the 5209 may be required.

The following IBM PC 3278/79 emulation packages have been tested and found to offer most of the 5209's functions through secondary keyboard mappings:

- IBM PC 3270 Emulation Program Entry Level Version 1.0
- IBM 3278/79 Emulation Control Program Version 1.0
- IBM PC VM Bond Release 2.0

The 3270-PC requires a very small, no-charge software patch to be applied to the 3270-PC Control Program to allow passing of full key-stroke information. The 3270-PC patch for both Release 2.1 and 3.0 is provided in the 5209 User's Guide (which is shipped with each 5209).

S/36-S/38 Applications: S/36 or S/38 applications are all available through the 5209 with two exceptions. First, PC Support/36 and PC Support/38 are not available through the 5209. Secondly, 5209 attached displays cannot display System/36 Business Graphics Utility (BGU), System/36 GDDM, System/38 BGU, or System/38 GDDM output. Graphical output can be printed on a 5209-attached 4224 printer, however.

The 5209 Mdl 1 3270-5250 Link Protocol Converter has US English customization screens. There are user guides translated into Spanish and Kanji to interpret these screens. All S/36 and S/38 keyboard and character set mappings are supported for 5250 applications except Kanji, Japan (English), and Katakana. 3270 keyboard and character sets are not impacted for 3270 applications. Right-to-left displays and double-byte terminals are not supported.

Performance: The 5209 has no perceptible impact on S/36 or S/38 response time. There is no perceptible impact to System/370 response time when the 5209 is attached to an 3174 Control Unit. Less

than 1/5 second is added to S/370 response time when attached to the 3274 Control Unit.

Each 5209 has a maximum aggregate data rate of 1,500 lpm for attached printers.

SPECIFY

The default publication language is English. If a different language is required, specify one of the following:

Specify Code	Language
#9003	Spanish
#9004	Kanji

The power cord shipped with the 5209 Mdl 1 will be determined by the country to which the 5209 Mdl 1 is shipped.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

IBM 5209 LINE PROTOCOL CONVERTER PRODUCT SPECIFICATIONS

MACHINE NUMBER AND NAME

5209 3270-5250 Link Protocol Converter.

Model 1 001

DESCRIPTION

The 5209 Mdl 1 3270-5250 Link Protocol Converter allows up to seven 3270 devices to concurrently access S/36 or S/38 applications and S/370 applications. Attachable 3270 devices include displays, printers, 3270-PCs, and PCs with 3278/79 emulation cards.

The 5209 Mdl 1 provides one upstream twinaxial connection to a S/36, S/38, or 5294 control unit; one upstream co-axial connection to a 3174/3274; and seven downstream co-axial connections to 3270 terminals. It is not necessary for both upstream connections to be operational.

The following displays are supported:

3270	Model	Emulated 5250 Device
3178	C2,C3,C4	5291
3179	1	5292-1
3180	1	3180-2
3191	A10,B10	5291
3278	2,3,4	5291
3278	5	3180-2
3279	S2A,2A,3A	5291
3279	S2B,S3G, 2B,3B	5292-1
3279	2X,3X	5291 (5292-1 w/extended function feature)
3270-PC in "CUT" mode		5291 (monochrome) 5292 (color)
IBM PC with 3278/79 card		5291 (monochrome) 5292 (color)

The following keyboards are supported:

75-Key Typewriter	(3278, 3279)
87-Key Typewriter	(3278, 3279, 3178)
87-Key Attribute Select	(3278, 3279)
87-Key Typewriter/APL	(3278, 3279)
87-Key Attribute Select/APL	(3278, 3279)
122-Key Typewriter	(3179, 3180, 3191)
122-Key Typewriter/APL	(3179, 3180)

Data Entry, Text, and RPQ keyboards are not supported for 5250 applications. The IBM Enhanced (102-key) keyboard is not initially supported, but will be supported no later than fourth quarter 1987.

The following keyboards/character sets are supported:

Austria/Germany
Belgium
Canadian French
Denmark (Denmark/Norway Character Set)
Finland (Finland/Sweden Character Set)
French (AZERTY)
French (QWERTY)
International (Multinational Character

Set)
Italy
Japan (English)
Norway (Denmark/Norway Character Set)
Portugal
Spain
Spanish (Spanish Speaking Character Set)
Sweden (Finland/Sweden Character Set)
Swiss-French (Multinational Character
Set)
Swiss-German (Multinational Character
Set)
UK

The following SNA Character String (SCS) printers are supported:

3270	Model	Emulated 5250 Device
3262	3,13	5256-3
3268	2,2C	5256-3 (one color)
3287*	1,2,1C,2C	5256-3 (one color)
4224	201,202, 2E2,2C2	5256-3
4234	1	5256-3
4245	D12,D20	5256-3
5210	G1,G2	5219-D1,D2

*Some 3287 printers may not have the no-charge SCS feature installed. Add 4214 Mdl 1 emulated as 5256-3.

Hot Key Support: A 3270 display user may "hot key" ("jump") between one 5250 and one 3270 session at any time using a two-keystroke sequence. Neither session will be disrupted. The 5209 Mdl 1 presents display information to both upstream control units indicating that the display is still logically attached. Any supported 3270 display that has the extended highlighting feature may be the system console for the S/36 (5360 and 5362 system units).

Printer Support: Printers may be interactively assigned to either a 5250 or 3270 session. Any display on the same 5209 Mdl 1 may re-assign the printer. The 3270 printer may be the system printer for the S/36 and S/38. To the host system to which the printer has just been assigned, the printer appears to have been powered on. To the host system to which the printer had been assigned, the printer appears to have been powered off.

3270 Capabilities: The S/370 applications and 3270 ergonomics are not affected by the 5209 Mdl 1. Full 3270 capabilities are preserved when in session with the S/370 via the 3174/3274. For example, DFT sessions, extended data stream, programmable symbol sets, magnetic slot reader feature, magnetic scanner feature, or selector light pens will work for S/370 applications. However, these functions are not available for a 5250 session.

A shadow cursor is presented on the 3180-1 or 3278-5 display for DisplayWrite/36 users. Message information identical to the 3180-2 is presented on the 3180-1 on the 25th or 28th (132-character wide) line while running 5250 applications.

Cabling: Because the 5209 Mdl 1 functions essentially as a 3299 terminal multiplexor, 3270 cabling is preserved. One additional twinaxial cable for the S/36, S/38, or 5294 Remote Control Unit is required. Connection to the IBM Cabling System is supported and BALUNS are not required for the 5209 Mdl 1.

Automatic Device Recognition

The 5209 Mdl 1 automatically identifies the 3270 display and printer types that are attached. No additional configuration procedures may be required.

Keyboard Mapping: Default keyboard mappings are provided. An alternate keyboard mapping may be selected or created through an

easy-to-use, prompted configuration procedure using a display on Port 0. The configuration is stored in nonvolatile memory.

S/36-System/38 Applications: S/36 or S/38 applications are all available with the exception of S/36 and S/38 Business Graphics Utilities, PC Support/36, PC Support/38, System/36 GDDM, and System/38 GDDM.

The 5209 Mdl 1 3270-5250 Link Protocol Converter has US English customization screens. There are user guides translated into Spanish, German, and Kanji to interpret these screens. All S/36 and S/38 keyboard and character set mappings are supported for 5250 applications except Kanji and Katakana. 3270 keyboard and character sets are not impacted for 3270 applications. Right-to-left displays and double-byte terminals are not supported.

HIGHLIGHTS

- Up to seven 3270 devices attach concurrently to a S/36, S/38, or 5294 Remote Control Unit and a 3174/3274 per 5209 Mdl 1.
- "Hot key" ("jump") between two concurrent sessions (one session through a 3174/3274 on an S/370 and one on the S/36 or S/38)
- 3270 printers interactively assigned to either a 5250 or 3270 session
- Full 3270 capabilities, response time, and ergonomics maintained when in session with a S/370 via a 3174/3274
- Existing 3270 terminal cabling utilized
- Automatic device recognition
- User modifiable keyboard mapping
- 5250 application access includes DisplayWrite/36, Personal Services/36, and Personal Services/38.

OPERATING AND POWER CONTROLS

The 5209 Mdl 1 has a power on/off switch located on the back of the unit.

Physical Characteristics

- Height - 133.4mm (5.25 in)
- Width - 445mm (17.5 in)
- Depth - 566mm (22.3 in)
- Weight - 11.4kg (25 lbs) plus cable

Power Requirements

- 90 to 140V AC or 180 to 265V AC, 49 to 62 Hz.

Heat Output

- 96-watt seconds (22.9 calories, .09 BTU)

SPECIFIED OPERATING ENVIRONMENT

Hardware

- An available twinaxial port on the S/36, S/38, or 5294 Remote

Control Unit or a cable-through connection on an existing device

- A supported display on Port 0 if configuration is required
- The 5209 Mdl 1 appears to the 3174/3274 Control Unit to be a 3299 Terminal Multiplexor. The customer, therefore, needs to verify that any 3274 to which the 5209 Mdl 1 will be attached is properly featured to support a 3299. (All 3274 models except the 3274 Mdl 51C can support the 3299 Terminal Multiplexor with appropriate features.) The 3174 attaches the 3299 natively.

Software: Release 4 System/36 SSP or later compatible releases on the S/36 and Release 7 System/38 CPF or later compatible releases for the S/38 have been tested and will be supported.

Limitations

- The IBM Enhanced (102-key) keyboard is not initially supported for 5250 applications, but will be supported no later than fourth quarter 1987.
- Data Entry, Text, and RPQ keyboards are not supported for 5250 applications.
- Multiple session or DFT devices (ie, 3280, 3179-G, 3193, 3270-PC/G, 3270-PC/GX) are not supported for 5250 applications. The 3270-PC is supported as a single ("CUT") session device only.
- S/370 graphics are not available on the 3270-PC while in "CUT" mode.
- 3270 devices cannot display or print Business Graphic Utilities or GDDM graphical output from the S/36 and S/38.
- PC Support/36 and PC Support/38 are not available to the 3270-PC or IBM Personal Computer with 3278/79 emulation cards.
- The 5209 Mdl 1 does not have twinaxial cable-through and therefore must be the last device on a S/36 or S/38 port. Devices other than the 5209 Mdl 1 may be on the same port, but they reduce the number of devices the 5209 Mdl 1 can support.
- The IPDS data stream on the 4224 Printer is not supported for 5250 applications.
- For service by IBM NSD service personnel, the system console must be within 20 ft. of the system unit.
- For each 5209 Mdl 1, an aggregate data rate of more than 1300 lpm may not be achieved for attached printers.
- 3278/3279 Emulation Program (#1502421) has restricted keyboard functions and provides limited capabilities.
- The 5209 Mdl 1 cannot be attached to a 3274-51C because the 3274-51C does not support the 3299 Terminal Multiplexor.

Considerations: The English language publications are the default. If other languages are required, a specify code is required. The proper power cord is determined by the customer country of origin.

5210 PRINTER MODELS E01, E02**THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT****PURPOSE**

A bidirectional, impact printer providing high quality printed output for the 8100 Information System. Print wheels in 10 pitch, 12 pitch, 15 pitch or proportional spacing are available to provide a selection of type style and graphic variations.

MODELS E01, E02**Model E01: (NO LONGER AVAILABLE)**

40 cps

Model E02: 60 cps

Prerequisites: Appropriately configured IBM 8100 Information System and DPCX/DOSF Release 3 or DPPX/SP.

Customer Setup (CSU): The 5210 is designed as a Customer Setup device, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, refer to the GI section. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine.

Limitations

1. Continuous forms:

Pin-fed continuous forms can be used. See "Optional Features" for Forms Stand and Continuous Forms Feed Device. Both edges of the pin-fed forms must be fastened in the forms tractors. No staples are permitted in the areas exposed to the interchangeable print wheel.

Printer operation and print quality vary with paper and number of copies. Multiple part forms should be tested in operating conditions to verify that results are satisfactory.

Paper Specifications:

- Maximum carbons: 5
- Maximum paper width: 392mm (15.4 in.)
- Maximum pin-to-pin width on forms tractor is 368mm (14.5 in.)
- Maximum print-line width: 335mm (13.2 in.)

2. Single sheet feed is by hand insertion, unless the optional Cut Sheet Feed Device (#7860) (NO LONGER AVAILABLE) or Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875) is used.

3. Drawer selection of the sheet feed is limited to the L2DCA (SNA-LU1) data stream. Only the bottom drawer is accessible with the SCS (SNA-LU1) data stream using the forms feed command. The writing line is reduced to 11.69 inches (296.9mm) maximum when using automatic cut sheet paper handling equipment.

4. Cut Sheet Feed and Front Exit Sheet and Envelope Feed Device Paper Recommendations:

Suitable Paper: All of the papers placed in the IBM Cut Sheet Feed and Front Exit Sheet and Envelope Feed Devices should be new, unused and without packaging damage. To ensure feed reliability, all papers should be "riffled" or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the IBM Cut Sheet Feed and Front Exit Sheet and Envelope Feed Devices.

Type and Composition: Plain bond paper of one of the following compositions:

- No. 1 sulfite (100 percent chemical wood pulp)
- 25 percent cotton content
- 50 percent cotton content
- 100 percent cotton content
- Paper made from recycled office paper.

Size: The following paper sizes can be fed either lengthwise or sideways unless otherwise noted.

- * 178mm x 267mm (7.0 in. x 10.5 in.)
- * 185mm x 267mm (7.25 in. x 10.5 in.)
- * 191mm x 267mm (7.5 in. x 10.5 in.)
- 203mm x 267mm (8.0 in. x 10.5 in.)
- * 203mm x 330mm (8.0 in. x 13.0 in.)
- 216mm x 279mm (8.5 in. x 11.0 in.)
- * 216mm x 330mm (8.5 in. x 13.0 in.)
- * 216mm x 356mm (8.5 in. x 14.0 in.)

*Feed lengthwise only.

Basis weights:

- 60g/square meter to 90g/square meter (16 to 24 lb.)
- Optimum: 75g/square meter to 90g/square meter (20-24 lb. bond) 25 percent or 50 percent cotton content

Unsuitable Paper for the cut sheet feeders: Following is a list of paper supplies that may be found in an office that will not feed reliably and may cause misfeeds and paper jams. (This list is not intended to be all-inclusive.)

- Coated paper
- Vellum paper
- Coated erasable bond paper
- Synthetic papers (rice paper, parchment, etc.)
- Translucent paper
- Multi-sheet forms and documents (bound or unbound)
- Peel-off, pressure sensitive labels
- Some types of chemically-treated papers (such as paper used to make copies without carbon paper)
- Preprinted forms requiring critical character placement
- Dark colored paper
- Envelopes
- Card stock
- Folded or creased documents
- Paper with exposed gummed surfaces, holes, perforations, cutouts or windows
- Highly embossed paper* (embossment height exceeding 0.508mm (0.02 in.))
- Preprinted papers containing chemicals or substances that leave a residue on the Cut Sheet Feed Device or printer components
- A mix of different sizes and types of paper in a paper tray
- Paper in unsatisfactory conditions:
 - Paper with excessive curl or waviness exceeding 3mm (0.118 in.)
 - Reams of paper with edges or corners folded or bonded together (fluffing may correct this condition)
 - Paper with poorly cut (rough) edges

Note: Paper should not be exposed to adverse temperature or humidity conditions (consult the paper manufacturer for recommended storage environment).

* Note: Embossments should not be located within 15mm (0.59 in.) of any edge of the sheet.

5. Envelope Recommendations:

a. Suitable Envelopes:

Envelope feeding characteristics vary with the type size and weight of envelopes used.

All of the envelopes placed in the Front Exit Sheet and Envelope Feed devices should be new, unused, and without packaging damage. The envelopes defined in this section are the only ones considered acceptable for use in the Front Exit Sheet and Envelope Feed devices.

b. Type and Composition:

Well sized bond paper with non-coated surfaces.

Paper and envelope capacities for automatic paper handling options: Each paper source drawer holds 200 sheets and the exit tray holds 400 sheets. The envelope source and exit hopper holds 100 envelopes each. Quantities are approximate and may vary depending on paper weight.

c. Size: The size of envelopes that can be fed range from 98.4mm to 114.8mm (3.875 in. to 4.5 in.) in width and 190.5mm to 241.3mm (7.5 in. to 9.5 in.) in length.

d. Basis weights:

- Optimum: 75g/square meter (20 lb.) sulfite or 25 percent cotton content plain bond envelopes.

e. Unsuitable Envelopes:

Following is a list of envelope supplies that may be found in an office that will not feed reliably and may cause misfeeds and envelope jams. (This list is not intended to be all-inclusive.)

- Window envelopes
- Envelopes with holes, perforations, cut out or deep embossing
- Envelopes with side flaps, i.e., flaps that fold along the short dimension of the envelope
- Envelopes with flaps that extend more than 60mm (2.36 in.) beyond the line of the fold

f. Unsuitable Envelope Conditions:

- Envelopes that are stuck together
- Envelopes that will not stack flat
- Envelopes that are damaged or bent such that they are interlocked

- Multiple 96-character print wheel options available by type style and language graphic variations. See "Specify" and "Print Wheel" chart in "Accessories" for details.
- Attaches to the 8100 System via the direct-attach loop (9600 bps or 38.4K bps), or data link-attached loop (9600 bps only).
- Ribbon Saver: Provides two modes of ribbon feed via a switch on the printer to allow two levels of print quality. Quality Mode provides approximately one million character yield; Saver Mode provides approximately three million character yield.
- Optional forms stand.
- Customer setup for early availability and relocation flexibility.

Problem Determination Procedures: Problem Determination (and recovery) Procedures are provided by IBM with the 5210 Printer. These procedures are designed to be easy to follow and use by the customer and it is the customer's responsibility to follow them prior to calling for IBM service.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5210.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions provided by IBM.
- Notifying IBM of intent to relocate and follow IBM instructions for relocation of the 5210 Printer.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal or relocation instructions and packing materials (if required) will be ordered by the Branch Office.
- Relocation of the 5210, if required, to allow IBM service access.
- Installation and maintenance of signal cables and associated cable connectors for attaching the 5210 to the direct attach loop on the 8100 System.

Bibliography: See "Kwic Index", GA20-1621, or Specific System Bibliography.

HIGHLIGHTS

- Mdl E01 has a rated burst print speed of up to 40 cps (assumes 96-character set with 10 pitch). Mdl E02 has a rated burst print speed of up to 60 cps (assumes 96-character set with 10 pitch).
- Accommodates horizontal character spacing of 10-pitch, 12-pitch, 15-pitch or proportional spacing, according to the print wheel selected (see 8100 DOSF Release 3 or DPPX/SP for limitations).
- Vertical spacing of 5-1/3, 6, or 8 lines per inch (see 8100/DOSF Release 3 or DPPX/SP for limitations). (Metric platen one line per centimeter.)
- Half-line spacing for superscripts and subscripts to a single level.
- First line registration, form skipping and spacing performed at the console by the user and then controlled by the licensed program.
- Single-speed carriage with skipping at up to 6 inches per second.
- Single sheet feeding by hand, or the optional Cut Sheet Feed Device (#7860) (NO LONGER AVAILABLE) or Front Exit Sheet and Envelope Feed (#7875) is used.
- Forms tractor for feeding continuous forms is optional.

SPECIFY

- Power (AC, 1-Phase): Specify #0802 for Low Range, (96.5-119V AC 50 Hz or 96.5-137V AC 60 Hz) or #0801 for High Range (193-259V AC 50 Hz or 193-254V AC 60 Hz). A power cord is shipped with the machine. The 3-digit WT Country Code on the DPMO sheet will be used to select a power cord and plug of the specifications most commonly used in that country.
 - Color: Pearl white only (no specify required).
 - Machine Nomenclature: Available at time of manufacture only.
- | | | |
|-----------------|----------|-------|
| Canadian French | German | #2929 |
| (Bilingual | Italian | #2932 |
| p/w) | Japanese | |
| English UK | English | #2930 |
| English US | Spanish | #2931 |
| French | | #2928 |
- Print Wheel Type Styles: One Courier 10 Data Processing print wheel is provided with the machine. Select the appropriate wheel by specifying the language support desired. Additional print wheels should be ordered as supplies using the individual accessory number (7 digits) for the Style and Country.
 - Language Support: Specify one.

Canada		Italy	#2968
Bilingual	#2977	Japan English	
English UK	#2958	English	#2955
English US		Latin America/	
(ASCII)	#2950	Puerto Rico	#2929
English US		Spain	#2960
(EBCDIC)	#2956		
France	#2964		
German	#2957		

- DPPX/SP Attachment: For attachment to an 8100 Information System running DPPX/SP, specify #9901.

SPECIAL FEATURES

Metric Platen (#0300): A no-charge, optional platen; the attaching system is required to support one line per centimeter index spacing (Set Single Line Density, SSLD in DCA-L2). This option is effected only with friction feed. Tractor feeding is unaffected by this option. English index increments are nominally short by approximately 0.005mm per mm of platen movement. Field Installation: No.

Continuous Forms Feed Device (#7850): Provides a variable-width tractor for feeding continuous forms. Field installation: Yes.

Cut Sheet Feed Device (#7860): (NO LONGER AVAILABLE) Provides for feeding cut sheets of paper from two source trays under system control. Consists of paper transport and output tray. Paper is stacked face down. See "Limitations" for paper specifications.

Front Exit Sheet Feed (#7870): Provides for feeding cut sheets of paper from two source trays under system control. Consists of paper transport and output tray. Paper is stacked face down. Field Installation: Yes. Customer Setup: Yes. See "Limitations" for Paper Specifications. Must have cable adapter for use with mdls E01 and E02. Cable adapter shipped with printer or with Front Exit Cut Sheet Feed Device if ordered for field installation. Prerequisites: Direct-Attach Loop or a Data Link-Attach Loop. Limitations: Refer to "Limitations", Item 3.

Front Exit Sheet and Envelope Feed (#7875): Provides for feeding cut sheets of paper from two paper source trays and envelopes from a separate source tray under system control. Consists of paper transport and separate output trays for cut sheets and envelopes. Paper is stacked face down. Field Installation: Yes. Customer Setup: Yes for mdls E01 and E02 above serial number 55166. Must have cable adapter for use with mdls E01 and E02. Cable adapter shipped with printer or with Front Exit Cut Sheet and Envelope Feed Device if ordered for field installation. Prerequisites: Direct-Attach Loop or Data Link-Attach Loop. Limitations: Refer to "Limitations", Item 3.

Add Envelope Feed Capability to the Front Exit Sheet Feed (#7876): Field Installation: Only. Prerequisites: Must have #7870 installed. Serial number must be above serial number 55166.

Add Envelope Feed Capability to the Front Exit Sheet Feed (#7877) (NO LONGER AVAILABLE): Field Installation: Only. Prerequisites: Must have #7870 installed. Serial number must be below serial number 55167.

Front Exit Sheet and Envelope Feed (#7878) (NO LONGER AVAILABLE): Provides cut sheet paper from two source trays and envelopes from a separate source tray under system control. Consists of paper transport and separate output trays for cut sheets and envelopes. Field Installation: Only. Serial number must be below 55167. Must have cable adapter which is shipped with this feature.

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

Model changes E01 to E02 are field installable. All features may be field installed.

ACCESSORIES

Accessories are available on purchase-only basis.

Paper Stacker/Tray (P/N 1494596): Permits feeding of continuous forms from a carton and provides for form stacking on a single shelf after printing. For shipment with the machine order by P/N.

Paper Table (P/N 1495352): Provides paper support and a movable guide to assist manual cut sheet insertion when Paper Feed Devices #7850, #7860 (NO LONGER AVAILABLE), #7870, or #7875 are not ordered.

Paper Trays (Top P/N 6819687, Bottom P/N 6819442): Provides additional trays for Cut Sheet Feed Device (#7860) (NO LONGER AVAILABLE), Front Exit Sheet Feed (#7870) and Front Exit Sheet and Envelope Feed (#7875). Eliminates paper removal/installation from trays when customer uses a wide variety of papers.

Print Wheels: Additional print wheels are available in a variety of print styles and character sets. These are supply items and are interchangeable with the print wheel supplied with the machine. Replacement and installation of the print wheel is the customer's responsibility. Additional print wheels for the 5210 may be ordered as accessories/supplies from Country DP Supplies Coordinator. Specify quantity required, quoting following P/Ns as appropriate:

Descriptions Specify Codes	Modern PSM	Bold PSM	Essay PSM
US/Australia			
KB ID 001-	1439517	1439504	1439526
Swiss-German/ Swiss-French			
KB ID 049&051-	1439518	1439509	1439527
Germany/ Austria			
KB ID 029-	1439597	1439589	1439629
France			
KB ID 251-	1439598	1439590	1439630
UK/Israel/ Latin			
KB ID 067-	1439599	1439591	1439631
Sweden/ Finland			
KB ID 053-	1439602	1439594	1439634
Denmark/Norway			
KB ID 057&055-	1439519	1439510	1439528
Canada/English			
KB ID 037-	1439550	1439538	1439562
Canada			
Bilingual			
KB ID 039-	1439551	1439539	1439563
Latin			
America/P/R.			
KB ID 025-	1439547	1439537	1439561
Italy			
KB ID 041-	1439600	1439592	1439632
Netherlands/ So. Africa			
KB ID 043-	1439601	1439593	1439633
Spain			
KB ID 045-	1439603	1439595	1439635
Japan/English	1439552	1439540	
Descriptions Specify Codes	Courier 10	Artisan 10	Prstige Pica 10
US/Australia			
KB ID 001-	1439511	1439520	1439503
Swiss-German/ Swiss-French			

MACHINES

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KB ID 049&051- Germany/ Austria	1439512	1439521	1439505
KB ID 029- France	1439565	1439613	1439581
KB ID 251- UK/Israel/ Latin	1439566	1439614	1439582
KB ID 067- Sweden/ Finland	1439567	1439615	1439583
KB ID 053- French/Belgium	1439570	1439618	1439586
KB ID 031- Denmark/Norway	1439650*		
KB ID 057&055- US Accounting	1439513	1439522	1439506
KB ID 017- EBCDIC	1439654*		
KB ID 101- ASCII	1439653*		
KB ID 103- Canada/English	1439652*		
KB ID 037- Canada	1439546	1439558	1439534
Bilingual			
KB ID 039- Latin	1439547	1439559	1439535
America/P/R.			
KB ID 025- Italy	1439545	1439557	1439533
KB ID 041- Netherlands/ So. Africa	1439568	1439616	1439584
KB ID 043- Spain	1439569	1439617	1439585
KB ID 045- UK/Israel/ Latin 88	1439571	1439619	1439587
KB ID 066- Canada/ Bilingual 88	1439638*		
KB ID 038- Sweden/ Finland 88	1439639*		
KB ID 052- Swiss- French 88	1439640*		
KB ID 048- Swiss- German 88	1439641*		
KB ID 050- Japan/English	1439642*		
	1439548		1439536
Descriptions and Specify Codes	Prstige Elite 12	Courier 12	Letter Gothic 12
US/Australia			
KB ID001- Swiss-German/ Swiss-French	1439502	1439523	1439514

KB ID 049&051- Germany/ Austria	1439507	1439524	1439515
KB ID 029- France	1439573	1439605	1439621
KB ID 251- UK/Israel/ Latin	1439574	1439606	1439622
KB ID 067- Sweden/ Finland	1439575	1439607	1439623
KB ID 053- French/Belgium	1439578	1439610	1439626
KB ID 031- Denmark/Norway	1439651		
KB ID 057&055- Canada/English	1439508	1439525	1439516
KB ID 037- Canada	1439530	1439554	1439542
Bilingual			
KB ID 039- Japan/English	1439531 1439532	1439555	1439543 1439544
Descriptions and Specify Codes	Prstige 15	Symbol 12*	Rhtoric *
US/Australia		*	
KB ID001- Swiss-German/ Swiss-French	1439655	1439639	1439736
KB ID 049&051- Germany/ Austria	1439689		1439745
KB ID 029- France	1439681		1439738
KB ID 251- UK/Israel/ Latin	1439694		1439749
KB ID 067- Sweden/ Finland	1439683		1439739
KB ID 053- French/Belgium	1439688		1439744
KB ID 031- Denmark/Norway	1439682		
KB ID 057&055- Canada/English	1439690		1439746
KB ID 037- Canada	1439684		1439740
Bilingual			
KB ID 039- Japan/English	1439685		1439741

* Only available as additional print wheels

SUPPLIES

Ribbons: The IBM 463 Ribbon (P/N 1299463) or equivalent.

5210 PRINTER MODEL G01, G02

PURPOSE

A bidirectional, impact printer providing correspondence quality printed output for the 3274 Control Unit (all mdls), a 3276 Control Unit Display Station (mdls 1-4, 11-14), a 4331, 4361 Processor, or 9370 Processor, a 4701 Finance Communication Controller, or a 8775 Control Unit Display Station. Print wheels in 10 pitch, 12 pitch, 15 pitch or proportional spacing are available to provide a selection of type style and graphic variations with appropriate application programming.

MODELS G01, G02

Model G01: (NO LONGER AVAILABLE)

40 cps (13.2 in. writing line*)

Model G02: 60 cps (13.2 in. writing line*)

* 11.69 in. writing line when using Automatic Cut Sheet Paper Handler (#7860) (NO LONGER AVAILABLE), Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875).

Note: Actual printer throughput is dependent upon operational and system characteristics. Factors such as controller configuration and line transmission speed, output format, and programming application processing must be considered in determining actual throughput.

The FIVE 3270 SE Aid is available to estimate printer performance for a particular environment in which the 5210 model G01, G02 will be installed. Use of this Aid is essential for understanding the effects of transmission line speed, data stream, protocol, and message sizes on system throughput.

Prerequisites: Customer must supply the printer to system (controller) attachment cable. The 3274 requires an available category A terminal port. The 3276 requires an available port or added feature #3255, #3256, or #3257. The 4701 requires an available port on the Device Cluster Adapter feature #3101. An 8775 requires Printer Attachment feature #5580. The 4331 and 4361 require an available port on the display/printer adapter or the 4361 Workstation Adapter. The 9370 requires a Workstation Subsystem Controller (#6020).

Customer Setup (CSU): The 5210 is designed as a Customer Setup device, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, refer to GI section. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine.

Limitations

1. Continuous forms:

Pin fed continuous forms can be used. (See "Special Features" for Forms Stand and Continuous Forms Feed Device.)

Both edges of the pin fed forms must be fastened in the forms tractors.

No staples are permitted in the areas exposed to the interchangeable print wheel.

Printer operation and print quality vary with paper and number of copies. Multiple part forms should be tested in operating conditions to verify that results are satisfactory. See "Forms Design Reference Guide for Printers", GA24-3488, for forms design considerations.

Paper Specifications:

- Maximum carbons: 5
- Maximum paper width: 392mm (15.4 in.)
- Maximum pin-to-pin width on forms tractor is 368mm (14.5 in.)

- Maximum print-line width: 335mm (13.2 in.).

2. Single sheet feed is by hand insertion, unless the optional Cut Sheet Feed Device (#7860) (NO LONGER AVAILABLE), Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875) is used. A top margin of one third of an inch is minimum for cutsheet paper. Application attempts to print in this area will result in the printer first moving the writing line (vertically) such that the base line of the graphic to be printed will appear one third of an inch from the top of the sheet. First print lines which contain superscripts will print the superscripts on the base line.

Printing should not include the last physical line area (4.8mm - 0.19 of an in. from the bottom of the sheet) on a cutsheet. Attempts to do so may result in loss of printed data.

3. Selection of paper and/or envelopes from the Front Exit Sheet and Envelope Feed options when used with the 5210 mdls G01/G02 is governed by the particular system data stream being used. Following is a summary of the ways paper and envelopes can be selected:

- In LU3 (DSC/DSE) selection of source drawers is available via the printer control panel only.
- In LU1 (SCS) selection of source drawers is available via the printer control panel or via a 2-B control in the Data Stream. The control is a Page Preparation Media (PPM) which is the same as the PPM of Document Content Architecture Final Form, Text Reference (L2-DCA). This control, if sent, will override the printer control panel setting.
- In LU1 (L2-DCA), selection of source drawers is via the PPM control in the Data Stream only.

4. Cut Sheet Feed Paper Recommendations:

Suitable Paper: All of the papers placed in the Cut Sheet Feed Device, Front Exit Sheet Feed or Front Exit Sheet and Envelope Feed Devices should be new, unused and without packaging damage. To insure feed reliability all papers should be "riffled" or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the Cut Sheet Feed Device, the Front Exit Sheet Feed, or the Front Exit Sheet and Envelope Feed Device.

Type and Composition: Plain bond paper of one of the following compositions:

- No. 1 sulfite (100 percent chemical wood pulp)
- 25 percent cotton content
- 50 percent cotton content
- 100 percent cotton content
- Paper made from recycled office paper

Size: The following paper sizes can be fed either lengthwise or sideways unless otherwise noted.

- * 178mm x 267mm (7.0 in. x 10.5 in.)
- * 185mm x 267mm (7.25 in. x 10.5 in.)
- * 191mm x 267mm (7.5 in. x 10.5 in.)
- * 203mm x 267mm (8.0 in. x 10.5 in.)
- * 203mm x 330mm (8.0 in. x 13.0 in.)
- * 216mm x 279mm (8.5 in. x 11.0 in.)
- * 216mm x 330mm (8.5 in. x 13.0 in.)
- * 216mm x 356mm (8.5 in. x 14.0 in.)

- * Feed lengthwise only.

Basis weights:

- 60g/square meter to 90g/square meter (16 to 24 lb.)
- Optimum: 75g/square meter to 90g/square meter (20-24 lb. bond) 25 percent or 50 percent cotton content

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Unsuitable Paper for the cut sheet feeders.

Following is a list of paper supplies that may be found in an office that will not feed reliably and may cause misfeeds and paper jams. (This list is not intended to be all-inclusive).

- Coated paper
- Vellum paper
- Coated erasable bond paper
- Synthetic papers (rice paper, parchment, etc)
- Translucent paper
- Multi-sheet forms and documents (bound or unbound)
- Peel-off, pressure sensitive labels
- Some types of chemically-treated papers (such as paper used to make copies without carbon paper)
- Preprinted forms requiring critical character placement
- Dark colored paper
- Envelopes
- Card stock
- Folded or creased documents
- Paper with exposed gummed surfaces, holes, perforations, cutouts or windows
- Highly embossed paper* (embossment height exceeding 0.508mm (0.02 in.))
- Preprinted papers containing chemicals or substances that leave a residue on the Cut Sheet Feed Device or printer components
- A mix of different sizes and types of paper in a paper tray
- Paper in unsatisfactory conditions:
 - Paper with excessive curl or waviness exceeding 3mm (0.118 in.)
 - Reams of paper with edges or corners folded or bonded together (fluffing may correct this condition.)
 - Paper with poorly cut (rough) edges

Note: Paper should not be exposed to adverse temperature or humidity conditions (consult the paper manufacturer for recommended storage environment).

Note: Embossments should not be located within 15mm (0.59 in.) of any edge of the sheet.

5. Envelope Recommendations:

Suitable Envelopes:

Envelope feeding characteristics vary with the type, sizes and weight of envelopes used.

All of the envelopes placed in the Front Exit Sheet and Envelope Feed should be new, unused, and without packaging damage. The envelopes defined in this section are the only ones considered acceptable for use in the Front Exit Sheet and Envelope Feed devices.

Type and Composition:

United States: Plain bond envelopes of one of the following compositions:

- No. 1 sulfite (100 percent chemical wood pulp)
- 25 percent cotton content
- 50 percent cotton content
- 100 percent cotton content
- Paper made from recycled office paper
- White envelopes.

World Trade: Well-sized boxed paper with non-coated surfaces.

Size: The following United States standard envelope sizes can be fed:

- No. 7 3/4 98.4mm x 190.5mm (3.875 in. x 7.5 in.)
- No. 9 98.4mm x 225.4mm (3.875 in. x 8.875 in.)
- No. 10 114.8mm x 241.3mm (4.5 in. x 9.5 in.)

The size of World Trade envelopes which can be fed range from 98.4mm to 114.8mm (3.875 in. to 4.5 in.) in width and 190.5mm to 241.3mm (7.5 in. to 9.5 in.) in length.

Basis weights:

- Optimum: 75g/square meter (20 lb.) sulfite or 25 percent cotton content plain bond envelopes.

Unsuitable Envelopes:

Following is a list of envelope supplies that may be found in an office that will not feed reliably and may cause misfeeds and envelope jams. (This list is not intended to be all-inclusive.)

- Window envelopes
- Envelopes with holes, perforations, cut out or deep embossing
- Envelopes with side flaps, i.e., flaps that fold along the short dimension of the envelope
- Envelopes with flaps that extend more than 60mm (2.36 in.) beyond the line of the fold

Unsuitable Envelope Conditions:

- Envelopes that are stuck together
 - Envelopes that will not stack flat
 - Envelopes that are damaged or bent such that they are interlocked
6. Each of the paper source trays in the Cut Sheet Feed, Front Exit Sheet Feed and Front Exit Sheet and Envelope Feed Device will hold approximately 200 sheets of paper and the exit tray holds approximately 400 sheets. The envelope source and exit tray on the Front Exit Sheet and Envelope Feed Device hold approximately 100 envelopes each.
 7. The 5210 G01, G02, at power on (default) is set to 10 pitch 6 lines per inch and the Courier 10 data processing print wheel is assumed mounted. When the DCA-L2 data stream is selected, the printer is set to 10 pitch, 6 lines per inch and the operator will be instructed to mount the Courier 10 word processing printwheel. Other pitch line space selections and character print wheel arrangements supported by the printer must be transmitted to the printer via the data stream from the connecting host/controller or entered via the printer console by the operator when transmitting 3270 Display/Printer Data Streams. 5-1/3, 9.6, 12, 24 and 48 lines per inch, 1 line per cm and PSM require DCA-L2 data stream application support.
- Some configurations do not support all data stream architectures. See attaching system/controller for support provided.
8. Printer interface support when attached to 3274s, 3276s or 8775s is either LU type 3 using 3270 Display/printer data stream or as LU type 1 using the SCS data stream. 3274 also supports using the DCA-L2 data stream as LU type 1. Non-SNA (BSC/Direct Channel) data streams are also supported. The 4701 supports the SCS data stream only. The 4331 and 4361 Display/Printer Adapter or the 4361 Workstation Adapter or 9370 Workstation Subsystem Controller support 3270 data stream in non-SNA mode only.
 9. See the operators guide for additional super/subscribing limitations.

HIGHLIGHTS

- The 5210 consists of control functions, printer and indicator lights in one integrally designed desk-top unit. Special user selectable features (at time of order) permit tailoring of the printer to user requirements.
- Mdl G01 has a rated burst print speed of up to 40 cps (assumes 96-character set with 10 pitch). Mdl G02 has a rated burst print speed of up to 60 cps (assumes 96-character set with 10 pitch).

- Provides printing for either 3270 mode (SNA LU3 or BSC/Direct Channel), SCS (SNA LU1) mode or Document Content Architecture DCA-L2* (SNA LU1) mode (see note 5 under Limitations).
- Dual case operation.
- Accommodates horizontal character spacing of 10 pitch, 12 pitch, 15 pitch, or proportional spacing (DCA-L2 with 3274 only), according to the print wheel selected (see limitations 4).
- Vertical spacing of 3.4, 5-1/3, 6, 8, 9.6, 12, 24, or 48 lines per inch and 1 line per centimeter (see limitations 4 and 5).
- Cancel print.
- Half-line spacing for superscripts and subscripts to a single level (DCA-L2 only). (See limitations 2 and 6.)
- First line registration, form indexing and spacing performed at the console by the user and then controlled by the user program.
- Operator selectable national use character sets (SCS and 3270 data streams only).
- Maximum print positions available when using cutsheet manual or continuous form feed/10 pitch - 132; 12 pitch - 158; 15 pitch - 198; (PSM max is dependent upon text content).
- Multiple speed carriage with indexing at up to 6 inches per second vertically.
- Single sheet feeding by hand, or the optional Cut Sheet Feed Device, Front Exit Sheet Feed or Front Exit Sheet and Envelope Feed (see limitations 3).
- Variable width forms tractor for feeding continuous forms is optional (see limitations 1).
- Multiple 96-character print wheel options available by type style and language graphic variations. See 'Specify' and 'Print Wheel' chart in 'Accessories' for details.
- Metric platen (1 line/cm with CDA-L2 control) optional.
- Ribbon Saver: Provides two modes of ribbon feed via a switch on the printer to allow two levels of print quality. General Correspondence Mode provides approximately one million character yield; Saver Mode provides approximately three million character yield with a decrease in print quality.
- Optional forms stand.
- Customer Setup for early availability and relocation flexibility.

* DCA-L2 is supported by the 3274 only.

Problem Determination Procedures: Problem Determination (and recovery) Procedures are provided by IBM with the 5210 Printer. These procedures are designed to be easy to follow and use by the customer and it is the customer's responsibility to follow them prior to calling for IBM service. See "Customer Responsibilities".

Customer Responsibilities: The customer is responsible for:

1. Receipt, unpacking and placement of the 5210.
2. Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions provided by IBM.
3. Notifying IBM of intent to relocate and follow IBM instructions for relocation of the 5210 Printer.
4. Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal or relocation instructions and packing materials (if required) will be ordered by the Branch Office.
5. Relocation of the 5210, if required, to allow IBM service access.

6. Procurement, installation and maintenance of signal cables and associated cable connectors for attaching the 5210 to the 3274, 3276 4331, 4361, 9370 and 8775 controllers. Maximum distance from controller to terminal is 610m (2000 ft.) using shielded twisted pair cable or 1500m (4920 ft.) using coaxial cable.

Basic Configuration: Base machine is shipped with the following specifications:

- Voltage: high or low option
- Power cord plug; nonlocking
- Power cord length; 3m (9.8 ft.)
- Printwheel: 10 pitch Courier (data processing)
- Print ribbon cartridge: IBM Part No. 1299463
- Character print operation: 1920 bytes

Publications: See "Kwic Index", GA20-1621, or specific system bibliography.

SPECIFY

Note: A 3 meter power cord and plug are shipped from the plant of manufacture.

- Power (AC, 1-Phase): Specify #0802 for Low Range, (96.5-119V AC/50 Hz or 96.5-137V AC/60 Hz) or #0801 for High Range (193-259V AC/50 Hz or 193-254V AC/60 Hz). A power cord is shipped with the machine.
- The 3-digit WT Country Code in the DPMO sheet will be used to select a power cord and plug of the specifications most commonly used in that country. If an exception to the above is required, a country RPQ may be initiated.
- Color: Pearl white only (no specify required).
- Machine Nomenclature, Courier 10 DP print wheel, CSU/OP guide translation, language default (power up)

Canadian		
French		French #2928
(Bilingual		
p/w)	#2935	German #2929
English UK	#2927	Italian #2932
English US		
EBCDIC	#2924	Spanish #2931

- Print Wheel Type Styles (no specify required) data processing Courier 10.
- Cables: See 'Accessories' and "Installation Manual - Physical Planning", GA27-2787 (3268 Printer), for cable details.
- Compatibility Options for the 3270 Data Stream Operation: Operation of the 5210 is defined as standard. Alternate operation may be specified. Note: Standard 5210 operation is the same as the standard 3287 mdls 1 and 2.

The following feature selections are optional at time of original machine order only and are not field installable:

1. CARRIAGE RETURN (CR) AT MPP PLUS 1

Standard: An automatic New Line (NL) is executed at MPP plus 1, then the CR is executed. The next print position will be the first print position of the next line.

#9608 No automatic New Line (NL) is executed. The CR is executed at MPP plus 1. The next print position will be the first print position of the current line. Compatible with 3287 RPQ S30219.

2. NEW LINE (NL) AT MPP PLUS 1

Standard: An automatic New Line (NL) is executed at MPP plus 1, then the NL is executed. The next print position will be the first print position of the current line plus 2.

#9609 No automatic New Line (NL) is executed. The NL is executed at MPP plus 1. The next print position will be the first print position of the next line. Compatible with 3287 RPQ S30219.

3. FORM FEED FOLLOWED BY DATA

Standard: The form will be skipped to the first line of the next form and the next print position will be the second print position of that line.

#9610 The form will be skipped to the first line of the next form and the next print position will be the first print position of that line. Compatible with 3289 RPQ S30220-SC3752.

4. FORM FEED IS LAST CHARACTER IN PRINT ORDER

Standard: An automatic New Line (NL) is executed after the form feed is completed. The next print position will be the first print position of the second line on the next form.

#9611 The automatic New Line (NL) is suppressed at the completion of the form feed. The next print position will be the first print position of the first line of the next form. Compatible with 3287 RPQ S30219-SC3749.

5. NULL SUPPRESSION

Standard: If an entire print Line contains no printable characters, no New Line (NL) is performed. Space (X'40') is considered a printable character. Next print position is the first print position of current line.

#9612 Prints all null lines as a blank line and performs a new Line (NL). Next print position is first print position of next line. Compatible with 3287 RPQ ML0442-SC 3741 or 3287 RPS MK3988 - SC3741.

6. FORM FEED (FF) COMMAND POSITION

Standard: Execute a Form Feed (FF) command only if it occurs at the first print position in a line or at MPP plus 1. Treat Form Feed (FF) at other positions as spaces.

#9613 Execute a Form Feed (FF) command whenever it is encountered in the Data Stream. Compatible with 3287 RPQ ML0442 - SC3739 or 3287 RPQ MK3988 - SC3739.

7. AUTOMATIC FUNCTION AT END OF PRINT BUFFER

Standard: An automatic New Line (NL) is executed following a print order, unless a New Line, Carriage Return or Forms Feed was the last function executed.

#9614 An automatic Form Feed (FF) is executed following a print order (unless a form feed was the last function executed). Next print position is first print position of first line of next form. Compatible with 3287 RPQ MK3988 - SC3740. This feature is ignored if feature #9604 is selected.

8. SUPPRESS TIMEOUT - NO DATA LOSS I.R.

Standard: A 1 minute or 10 minute timeout with message to host following an intervention required condition.

#9605 Suppress 1 minute and 10 minute timeouts with message to host of intervention required.

9. AUTO FORM FEED AT END OF LOCAL COPY

Standard: Execute form feed command as encountered in data stream or setting.

#9604 Execute auto form feed at end of operator initiated local copy operation (unless a form feed was the last function executed). The next print position is the first print position of line one of the next form (overrides #9614).

- Character Print Operation: The basic machine provides for operation with a program which requires a print buffer of 1,920 bytes while using Erase/Write Alternate Command. For other buffer size requirements, specify as listed below.

#9521 (960 character print operation) for use with a program which requires a printer buffer size of 960 bytes while using Erase/Write Alternate Command.

#9523 (2,560 character print operation) for use with a program which requires a printer buffer size of 2,560 bytes while using Erase/Write Alternate Command.

#9524 (3,440 character print operation) for use with a program which requires a print buffer size of 3,440 bytes while using Erase/Write Alternate Command.

#9525* (3,564 character print operation) for use with a program which requires a print buffer size of 3,564 bytes while using Erase/Write Alternate Command.

* 3274 only

SPECIAL FEATURES

Metric Platen (#0300): An optional platen; the attaching system is required to support one line per centimeter index spacing (Set Single Line Density (SSLD in DCA-L2). This option is effective only with friction feed. Tractor feeding is unaffected by this option. English index increments are nominally short by approximately 0.005mm per mm of platen movement. Available at time of order only (not field installable).

Continuous Forms Feed Device (#7850): Provides a variable width tractor for feeding continuous forms.

Cut Sheet Feed Device (#7860): (NO LONGER AVAILABLE) Provides for feeding cut sheets of paper from two source trays under System Control. Consists of paper transport and output tray. Paper is stacked face down. See Limitations #3 for drawer selector and Paper Specifications.

Front Exit Sheet Feed (#7870): Provides for feeding cut sheets of paper from two source trays. Consists of paper transport and output tray. Paper is stacked face down. Field Installation: Yes. Customer Setup: Yes. See 'Limitations' for Paper Specifications. Must have cable adapter for use with mdls G01 and G02. Cable adapter shipped with printer or with Front Exit Sheet Feed if ordered for field installation.

Front Exit Sheet and Envelope Feed (#7875): Provides for feeding cut sheets of paper from two paper source trays and envelopes from a separate source tray. Consists of paper transport and separate output trays for sheets and envelopes. Paper and envelopes are stacked face down. Field Installation: Yes. Customer Setup: Yes. See 'Limitations' for paper and envelope specifications. Must have cable adapter for use with mdls G01 and G02. Cable adapter shipped with printer or with Front Exit Sheet Feed if ordered for field installation.

Add Envelope Feed Capability to the Front Exit Sheet Feed (#7876): Field Installation: Only. Customer Setup: No. Prerequisites: Must have #7870 installed.

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

Model changes G01 to G02 are field installable.

ACCESSORIES

Cables: Cables and or associated parts to attach the 5210 to the 3274 Control Unit and 3276 Control Unit Display Station may be purchased from IBM or from a customer-selected source. For the proper identification, installation, and application of the subject cables and parts, see "IBM 3270 Installation Manual - Physical Planning", GA27-2787, and "Coaxial Cable and Accessories Manual", GA27-2805. The customer is responsible for installation and maintenance of these cables and their associated parts.

Item Number	Description
Assm 2577672	Cable Assembly In-Door
Bulk 0323921	Coax Wire (Note 1)
P/N 1836418	Connector Kit (Note 1)
Assm 1833108	Cable Assembly Out-Door
Bulk 5252750	Coax Wire (Note 2)
P/N 1836419	Connector Kit (Note 2)
P/N 1833104	Station Protector Kit, Carbon (Note 4)
P/N 2621414	Modification Kit (Note 3)
P/N 1833106	Station Protector Attachment Kit (Note 5)
P/N 5252772	Station Protector Element Carbon (Note 6)
P/N 5252643	Adapter (Note 7)
P/N 1830818	Station Protection Kit, Gas (Note 4)
P/N 5252899	Station Protector Element, Gas (Note 6)

Order the above items via MES from Poughkeepsie. Allow a lead time of 120 days.

Notes:

1. Coax wire and one connector kit (includes two connectors P/N 1836446) required for each indoor cable assembly.
2. Coax wire and one connector kit (includes two connectors P/N 1836447) required for each outdoor cable assembly.
3. Customers replacing 2260 display stations may utilize the existing installed cables by use of this modification kit. One kit required for each cable.
4. Must be used with outdoor cable assembly when installed outdoors (either above or below ground level). One kit required for each cable assembly.
5. Use to attach outdoor cable to station protector. One kit is required for each cable assembly.
6. Replacement station protector elements.
7. Use to join two P/N 2577672 or two P/N 1833108 cable assemblies together.

Paper Trays (Top P/N 6819687) (Bottom P/N 6819442): Provides additional trays for Cut Sheet Feed Device (#7860) (NO LONGER AVAILABLE). Eliminates paper removal/installation from trays when customer uses a wide variety of paper.

Paper Stacker/Tray (P/N 1494596): Permits feeding of continuous forms from a carton and provides for form stacking on a single shelf after printing.

Paper Table (P/N 1495352): Provides paper support and a moveable guide to assist manual cut sheet insertion when Cut Sheet Feed Device (#7860) (NO LONGER AVAILABLE) is not ordered.

5210 Print Wheel Assemblies - Word Processing: Additional print wheels are available in a variety of print styles and character sets. These are supply items and are interchangeable with the print wheel supplied with the machine. Replacement and installation of the print wheel is the customer's responsibility. Additional print wheels for the 5210 may be ordered as accessories/supplies from

your Country DP Supplies Coordinator. Specify quantity required, quoting following P/Ns as appropriate:

Descriptions Specify Codes	Modern PSM	Boldface PSM	Essay PSM
US/Australia KB ID 001-	1439517	1439504	1439526
Swiss-German/ Swiss-French KB ID 049&051-	1439518	1439509	1439527
Germany/Austria KB ID 029-	1439597	1439589	1439629
France KB ID 251-	1439598	1439590	1439630
UK/Israel/Latin KB ID 067-	1439599	1439591	1439631
Sweden/Finland KB ID 053-	1439602	1439594	1439634
Denmark/Norway KB ID 057&055-	1439519	1439510	1439528
Canada/English KB ID 037-	1439550	1439538	1439562
Canada Bilingual KB ID 039-	1439551	1439539	1439563
Latin America/P/R. KB ID 025-	1439547	1439537	1439561
Italy KB ID 041-	1439600	1439592	1439632
Netherlands/So. Africa KB ID 043-	1439601	1439593	1439633
Spain KB ID 045-	1439603	1439595	1439635
Japan/English	1439552	1439540	
Descriptions And Specify Codes	Prestige Elite 12	Courier 12	Letter and Gothic 12
US/Australia KB ID 001-	1439502	1439523	1439514
Swiss-German/ Swiss-French KB ID 049&051-	1439507	1439524	1439515
Germany/Austria KB ID 029-	1439573	1439605	1439621
France KB ID 251-	1439574	1439606	1439622
UK/Israel/Latin KB ID 067-	1439575	1439607	1439623
Sweden/Finland KB ID 053-	1439578	1439610	1439626

MACHINES

M 5210.10
SEP 87

French/Belgium
KB ID 031- 1439651

Denmark/Norway
KB ID 057&055- 1439508 1439525 1439516

Canada/English
KB ID 037- 1439530 1439554 1439542

Canada Bilingual
KB ID 039- 1439531 1439555 1439543

Japan/English 1439532 1439544

Note: * Only available as additional print wheels

Netherlands/So. Africa
KB ID 043- 1439569 1439617 1439585

Spain
KB ID 045- 1439571 1439619 1439587

UK/Israel/Latin 88
KB ID 066- 1439638*

Canada/Bilingual 88
KB ID 038- 1439639*

Sweden/Finland 88
KB ID 052- 1439640*

Swiss/French 88
KB ID 048- 1439641*

Swiss/German 88
KB ID 050- 1439642*

Japan/English 1439548 1439536

Descriptions Specify Codes	Courier 10	Artisan 10	Prestige Pica 10
US/Australia KB ID 001-	1439511	1439520	1439503

Swiss-German/ Swiss-French KB ID 049&051-	1439512	1439521	1439505
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Germany/Austria KB ID 029-	1439565	1439613	1439581
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France KB ID 251-	1439566	1439614	1439582
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UK/Israel/Latin KB ID 067-	1439567	1439615	1439583
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Sweden/Finland KB ID 053-	1439570	1439618	1439586
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French/Belgium KB ID 031-	1439650*		
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Denmark/Norway KB ID 057&055-	1439513	1439522	1439506
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US Accounting KB ID 017-	1439654*		
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EBCDIC KB ID 101-	1439653*		
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ASCII KB ID 103-	1439652*		
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Canada/English KB ID 037-	1439546	1439558	1439534
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Canada Bilingual KB ID 039-	1439547	1439559	1439535
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Latin America/P/R. KB ID 025-	1439545	1439557	1439533
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Italy KB ID 041-	1439568	1439616	1439584
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Descriptions and Specify Codes	Prestige 15	Symbol 12*	Rhtoric *
US/Australia KB ID001-	1439655	1439639	1439736

Swiss-German/ Swiss-French KB ID 049&051-	1439689		1439745
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Germany/Austria KB ID 029-	1439681		1439738
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France KB ID 251-	1439694		1439749
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UK/Israel/Latin KB ID 067-	1439683		1439739
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Sweden/Finland KB ID 053-	1439688		1439744
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French/Belgium KB ID 031-	1439682		
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Denmark/Norway KB ID 057&055-	1439690		1439746
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Canada/English KB ID 037-	1439684		1439740
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Canada Bilingual KB ID 039-	1439685		1439741
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Note: * Only available as additional print wheels.

SUPPLIES

Ribbons: The IBM 463 Ribbon (P/N 1299463).

5216 WHEELPRINTER

PURPOSE

The 5216 Wheelprinter attaches to the IBM Personal Computers (5150, 5160, PCjr, Portable PC, PC/AT and 3270 PC/G/GX). In addition, the 5216 is designed for hardware and software compatibility with properly equipped and programmed non-IBM Personal Computers. Attachment is via the parallel or serial attachment interface and attachment cable (non-IBM Personal Computers may require a different attachment cable. Check with your IBM authorized dealer on point of sale for assistance. The customer is responsible for attaching the interface module which will accompany the base printer model. Also included with the base model are a Courier 10 ASCII printwheel, one ribbon cartridge, and "Guide-To-Operations for the IBM Wheelprinter". An interface attachment cable is required and must be ordered separately --- see "Ordering".

MODELS

Model 001 (Parallel): (NO LONGER AVAILABLE)

Model 002 (Serial): (NO LONGER AVAILABLE) 25 cps. Includes integrated continuous forms and a single-drawer cut-sheet paper handling function.

Note: The 5216 Wheelprinter is shipped with a ASCII Courier 10 printwheel, a cartridge ribbon, an IBM Personal Computer parallel or serial attachment module and a single-drawer cut-sheet paper tray. For attachment cables, see "Specify". See "Limitations" #7.

Physical Specifications:

		With Paper Tray
Unit	-	5216
Height	-	8.8 in. 13.8 in.
Width	-	22.9 in. 22.9 in.
Depth	-	16.1 in. 22.2 in.
Weight	-	15.7kg 34.5lb

Note: The 5216 conforms to common carrier shipping requirements, (e.g., UPS, Federal Express, etc.)

HIGHLIGHTS

- Letter quality impact printing.
- 25 cps burst print speed.
- Compact printer suitable for common carrier shipment for service/ repair (e.g., UPS, Federal Express, etc.)
- Four pitches and multiple type styles including word processing and ASCII printwheels.
- Drop-in film ribbon cartridge - IBM 9756 ribbon (single-strike) and IBM 9757 ribbon (multi-strike).
- Integrated paper handlers for cut-sheet and continuous forms.
- Removable tray with up to 100 sheet capacity (weight and paper thickness determines exact count).
- 13.2 inch writing line.
- Program-selectable vertical spacing in 1/48 inch/line increments.
- 8.5-inch wide paper can be fed automatically with the cut-sheet feed.
- 2.7 to 14.9-inch (pin-to-pin) paper can be fed with the continuous forms feed.
- 3.2 to 15.4-inch paper can be manually inserted.

- User-selectable impression control.
- IBM PC parallel interface module.
- RS-232-C serial interface module.

Customer Setup (CSU): The 5216 is designated as a Customer Setup machine. The marketing representative must advise the customer of his/her responsibilities before receipt of the machine. Customer setup instructions are shipped with the machine.

Limitations:

1. **Character Sets:** The 5216 may utilize any one of a variety of 96-character printwheels on any particular printing operation. It is the customer's responsibility to match the printwheel selected to the printing operation. Printwheels designed for the Wheelprinter have part numbers beginning with 1353XXX; no other printwheels are to be used. These printwheels, however, can be used on other 52XX printwheel printers.

2. **Continuous Forms:**

Pinfeed continuous forms can be used.

Both edges of the pinfeed forms must be threaded through the tractors.

No staples are permitted in the areas exposed to the interchangeable printwheel.

Printer operation and print quality vary with paper and number of copies. Multipart forms should be tested in operating conditions to verify that results are satisfactory. Impression level may be varied to differing paper weights.

Paper Specifications:

Maximum paper width is 392mm (15.4 in.). Maximum pin-to-pin width for continuous forms tractor is 378mm (14.9 in.). Maximum print-line width 335mm (13.2 in.).

3. **Single Sheetfeed:**

Single sheetfeed is by hand insertion, unless the integrated automatic cut-sheet feed feature is used. Multi-page printing with single (manual) sheetfeeding requires operator intervention.

4. **Paper Recommendations:**

All of the papers placed in the sheetfeed tray should be new, unused and without packaging damage. To ensure feed reliability, all papers should be "riffled" or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the sheetfeed tray.

Type and Composition: Plain bond paper of one of the following compositions:

- No. 1 sulfite (100 percent chemical wood pulp)
- 25 percent cotton content
- 50 percent cotton content
- 100 percent cotton content
- Paper made from recycled office paper

Paper Width:

- Manual: 81mm to 391mm (3.2 in. to 15.4 in.)
- Automatic Cut Sheet: 216mm (8.5 in.)
- Continuous Forms: 69mm to 378mm (2.7 to 14.9 in.) pin-to-pin

Paper Weights:

- 60 gm/sq.m to 90 gm/sq.m (16 lb to 24 lb).
- Optimum: 75 gm/sq.m to 90 gm/sq.m (20 lb to 24 lb bond), 25 percent or 50 percent cotton content.

Unsuitable Paper:

Following is a list of paper supplies that may be found in an office that are not recommended for use with this printer. (This list is not intended to be all-inclusive.)

- Coated paper.
- Vellum paper.
- Coated erasable bond paper.
- Synthetic papers (rice paper, parchment, etc.).
- Translucent paper.
- Multi-sheet forms and documents (bound or unbound)
- Peel-off, pressure-sensitive labels.
- Some types of chemically-treated papers (such as paper used to make copies without carbon paper).
- Preprinted forms requiring a high degree of character-placement accuracy.
- Dark colored paper.
- Envelopes.
- Card stock.
- Folded or creased documents.
- Paper with exposed gummed surfaces, holes, perforations, cutouts, or windows.
- Highly embossed paper (embossment height exceeding 0.508mm (0.02 in.). Note: Embossments should not be located within 15mm (0.59 in.) of any edge of the sheet.
- Preprinted papers containing chemicals or substances that leave a
- residue on the Sheetfeed Attachment or printer components.
- A mix of different sizes and types of paper in a paper tray.
- Paper in unsatisfactory conditions: Paper with excessive curl or waviness exceeding 3mm (0.118 in.) --- reams of paper with edges or corners folded or bonded together (fluffing may correct this condition) --- paper with poorly cut (rough) edges.

Note: Paper should not be exposed to adverse temperature or humidity conditions (consult the paper manufacturer for recommended storage environment).

5. Printwheels other than ASCII may require additional host programming.
6. See the "Wheelprinter Guide to Operations" for limitations on reverse line feed.
7. Attachment to other than IBM products may require other than the IBM attaching cable supplied. Contact your authorized IBM dealer for specifics.

SPECIFY

See "CONFIGURATIONS", below.

- (Canada only) > Voltage (115V AC, 1-phase, 60 Hz): No specify required. Standard power cord is 1.8m (6 ft.). <
- Printwheel Type Style: One is provided with the machine. Additional printwheels may be ordered as supplies by part number. See your country DP Supplies Coordinator. Contact IBM.
- Language and Machine Nomenclature: Language translations available at time of shipment for the "IBM Wheelprinter Guide to Operations" are listed under "Configurations". This P/N will also determine the machine nomenclature shipped with the machine.
- Printers are available to support high- and low-voltage ranges and language dependencies. Power cords are 2.9m (9.2 ft) and shipped with the printer. See "Configurations" for order information.

CONFIGURATIONS

Order by P/N for the country and language. () indicates language available for the P/N.

P/N 6453729 Serial Interface (English)

P/N 6453730 Parallel Interface (NO LONGER AVAILABLE)

Bahamas, Bermuda, Dominican Republic, Jamaica, Japan, Korea, Netherland Antilles, Taiwan, Trinidad

P/N 6453735 Serial Interface (Spanish)

P/N 6453736 Parallel Interface

Argentina, Uruguay, Chile, Peru

P/N 6453739 Serial Interface (Spanish)

P/N 6453740 Parallel Interface

Bolivia, Costa Rica, Ecuador, Guatemala, Colombia, Honduras, Panama, Venezuela

P/N 6453737 Serial Interface (Spanish)

P/N 6453738 Parallel Interface

Mexico

P/N 6453725 Serial Interface (English)

P/N 6453726 Parallel Interface

Canada

P/N 6453727 Serial Interface (French)

P/N 6453728 Parallel Interface

Canada

P/N 6453731 Serial Interface (English)

P/N 6453732 Parallel Interface

Hong Kong, Malaysia, Singapore, Australia, Indonesia, New Zealand, Thailand

P/N 6453733 Serial Interface (English)

P/N 6453734 Parallel Interface (NO LONGER AVAILABLE)

Philippines

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Paper Tray: (Canada, Mexico, Philippines only) > Canada, Mexico, Philippines #6010 P/N 8655073. <) Other #6011, P/N 8655088. Provides additional trays for Sheet Feed Paper Handler. Eliminates paper removal/installation from trays when customer uses a wide variety of papers.

Attachment Cable: Required to cable connect the 5216 Wheelprinter to the Personal Computer. Specify #6030, P/N 8509390 (NO LONGER AVAILABLE) for parallel attachment, 1.8m (6 ft.); #6031, P/N 8509386 (NO LONGER AVAILABLE) for serial attachment, 6m (19.5 ft.).

SUPPLIES

Ribbons: The IBM 9757 multi-strike film ribbon (P/N 1299757) or equivalent, the IBM 9756 single-strike film ribbon (P/N 1299756), or equivalent. None required with machine order. See your Country DP Supplies Coordinator. Contact IBM for details.

Printwheels: None required with machine order. Additional printwheels (P/N 1353XXX) are available in a variety of print styles

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and character sets (see TC 5210 pages in "Type Catalog"), and are interchangeable with the printwheel supplied with the machine (See "Limitations" #5). When ordering, consideration should be given to ordering a second identical printwheel for backup. Replacement and installation of the printwheel is a customer's responsibility. See your Country DP Supplies Coordinator. Contact IBM for ordering instructions.

Supply Starter Packs:

- 10 IBM 9757 ribbons, 1 courier 10 printwheel and 1 prestige elite 12 printwheel; use WT AAS #6000 or IBM Direct P/N 6295112
- 18 IBM 9756 ribbons, 1 courier 10 printwheel and 1 prestige elite 12 printwheel; use WT AAS #6100 or IBM Direct P/N 6293724

5216 Wheelprinter Printwheel Support for PC:

Font	Country/Keyboard		
	US (ASCII)	UK	Germany/Austria Alt.
Prestige Elite	-	1353101	1353102
Artisan 10	-	1353105	1353933
Courier 10	1353909	1353107	1353901
Letter Gothic	**	1353110	1353917
Courier 15	**	1353112	1353113
Courier 12	**	1353116	1353117
Gothic 15	**	1353121	1353122
Boldface	**	1353125	1353126
Essay	**	1353130	1353131
Font	Country/Keyboard		
	France*	Italy	Spain

Prestige Elite	1353574	1353104	1353103
Artisan 10	1353614	1353106	-
Courier 10	1353566	1353108	1353109
Letter Gothic	1353622	1353111	-
Courier 15	1353810	1353114	1353115
Courier 12	1353606	1353118	1353119
Gothic 15	1353733	1353123	-
Boldface	1353590	1353127	1353128
Essay	1353630	1353132	-

* ASCII Printwheels for France are the same as WP printwheels.

** Use UK Printwheels.

PUBLICATIONS

• Hardware Maintenance Service Manual

English US	P/N 6373228	SY20-8540
German	P/N 8649106	GA12-3694
Italian	P/N 8649105	SA13-1042
English UK	P/N 6373231	SY20-8578

• Guide-To-Operations *

Spanish	GA10-0046	P/N 6373185
English UK*	GA23-1028	P/N 8509385
German	GA12-3693	P/N 6373190
Dutch	GA14-5442	P/N 6373191
French	GA11-0310	P/N 6373187
Canadian Fr	GA09-0244	P/N 6373186
Danish	G511-0728	P/N 6373189
Finish	GA10-6908	P/N 6373193
Italian	GA13-1041	P/N 6373188
Norwegian	GA15-3649	P/N 6373194
English US*	GA23-1006	P/N 8509384
Swedish	GA14-0834	P/N 6373192

* Available on day of announcement. Unique country support available by December, 1985.

MACHINES
5217 PRINTER
PURPOSE

A bidirectional, impact printer providing letter quality printed output for the System/23 and the 5280 Distributed Data System. Print wheels in 10 pitch, 12 pitch, 15 pitch or proportional spacing are available to provide a selection of type style and graphic variations.

MODELS

Model C02 60 cps

Limitations:
1. Character Sets:

The 5217 Printer may utilize any one of a variety of 96-character type wheels on any particular printing operation. However, because a 5322 or 5324 computer and the 5280 Distributed Data System can display significantly more than 96 different characters, it is possible that all characters being displayed cannot be printed with the type wheel mounted on the printer.

It is the customer's responsibility to match the type wheel selected to the printing requirements.

For available character set details, refer to *Using Your 5217 Printer* (SA34-1593) for System/23, or *IBM 5280-5217 Printer Setup and Operator's Guide* (GA23-1016) for the 5280.

2. Continuous Forms:

Pin-fed continuous forms can be used. (See Special Features for Continuous Forms Feed device).

Both edges of the pin-fed forms must be fastened in the forms tractors.

No staples are permitted in the areas exposed to the interchangeable print wheel.

Printer operation and print quality vary with paper and number of copies. Multiple part forms should be tested in operating conditions to verify that results are satisfactory.

Paper Specifications

Maximum carbons is five

Maximum paper width is 392mm (15.4 in.)

Maximum pin-to-pin width on forms tractor is 368mm (14.5 in.)

Maximum print-line width is 335mm (13.2 in.)

- 3. Single sheet feed** is by hand insertion, unless the optional Cut Sheet Feed Device (#7860) is used. Multi-page printing with single sheet feeding requires operator intervention or special application programming support to avoid paperless printing. For further details, see *Using Your 5217 Printer* (SA34-1593) for System/23, or the appropriate 5280 language reference manual.

4. Cut Sheet Feed Device Paper Recommendations:
Suitable Paper

All of the papers placed in the IBM Cut Sheet Feed Device Handler should be new, unused and without packaging damage. To ensure feed reliability all papers should be "riffled" or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the IBM Cut Sheet Feed Device.

Type and Composition: Plain bond paper of one of the following compositions.

- No. 1 sulfite (100% chemical wood pulp).
- 25% cotton content.
- 50% cotton content.
- 100% cotton content.
- Paper made from recycled office paper.

Size: The following paper sizes can be fed either lengthwise or sideways unless otherwise noted.

- 178mm x 267mm * (7.0 in. x 10.5 in.)
- 185mm x 267mm * (7.25 in. x 10.5 in.)
- 191mm x 267mm * (7.5 in. x 10.5 in.)
- 203mm x 267mm (8.0 in. x 10.5 in.)
- 203mm x 330mm * (8.0 in. x 13.0 in.)

- 216mm x 279mm (8.5 in. x 11.0 in.)
- 216mm x 330mm * (8.5 in. x 13.0 in.)
- 216mm x 356mm * (8.5 in. x 14.0 in.)

* Feed lengthwise only.

Basic weights:

- 60g/sq.m to 90g/sq.m (16 lb to 24 lb)
- Optimum: 75g/sq.m to 90g/sq.m (20-24 lb bond) 25% or 50% cotton content.

Unsuitable Paper for the cut sheet feeder

Following is a list of paper supplies that may be found in an office that will *not* feed reliably and may cause misfeeds and paper jams. (This list is not intended to be all-inclusive).

- Coated paper.
 - Vellum paper.
 - Coated erasable bond paper.
 - Synthetic papers (rice paper, parchment, etc.).
 - Translucent paper.
 - Multi-sheet forms and documents (bound or unbound).
 - Peel-off, pressure sensitive labels.
 - Some types of chemically-treated papers (such as paper used to make copies without carbon paper).
 - Preprinted forms requiring a high degree of character placement accuracy.
 - Dark colored paper.
 - Envelopes.
 - Card stock.
 - Folded or creased documents.
 - Paper with exposed gummed surfaces, holes, perforations, cutouts, or windows.
 - Highly embossed paper (embossment height exceeding 0.508mm (0.02 in.).
- Note:** Embossments should not be located within 15mm (0.59 in.) of any edge of the sheet.
- Preprinted papers containing chemicals or substances that leave a residue on the Cut Sheet Feed Device or printer components
 - A mix of different sizes and types of paper in a paper tray.
 - Paper in unsatisfactory conditions:
 - Paper with excessive curl or waviness (exceeding 3mm (0.118 in.).
 - Reams of paper with edges or corners folded or bonded together (Fluffing may correct this condition).
 - Paper with poorly cut (rough) edges.

Note: Paper should not be exposed to adverse temperature or humidity conditions (consult the paper manufacturer for recommended storage environment).

(Japan only+)

- 5.** The 5217 Printer cannot be used with 5322 or 5324 Computers or a 5280 equipped with the Katakana Character Set, specify code #2973. +)

Prerequisites:

For System/23, each 5322 or 5324 Computer which will utilize the 5217 Printer must have the Second Printer Attachment (#6350) installed. However, when this feature is installed, the 5217 may be attached to either printer attachment.

For 5280, the 5285 Programmable Data Station must have Start/Stop Printer Attachment (#1152) installed. The 5288 Programmable Control Unit must have Multiple Start/Stop-Twinaxial Printer Attachment (#1162) installed. If #1152 or #1162 was shipped before April 1, 1983, the 5285 or 5288 also requires EC #467318.

5217 Printer (cont'd)
HIGHLIGHTS

- Rated burst print speed of up to 60 cps (assumes 96-character set with 10 pitch).
- Accommodates horizontal character spacing of 10 pitch, 12 pitch, or 15 pitch, according to the print wheel selected. Proportional spacing may be accomplished via customer application programming on the System/23 and the 5280.
- For the System/23, vertical spacing is program selectable in increments of 1/96 inch (0.0104 inch). For a single program command, the vertical movement is 4 increments minimum and 24 maximum. This permits line spacing from 4 lines/inch to 24 lines/inch.

The printer will default to 6 lines/inch if the user does not program select a vertical line spacing.

The lines per page parameter is also program-selectable.

- Single speed carriage with skipping at up to 6 inches per second.
- Single sheet feeding by hand, or the optional Cut Sheet Feed Device.
- Forms tractor for feeding continuous forms is an optional feature that is advantageous for multi-page printing applications and is required for successful printing operations encountered in the system support programs and some application programs.
- Multiple 96-character print wheel options available by type style and language graphic variations.
- Ribbon Saver: Provides two modes of ribbon feed via a switch on the printer to allow two levels of print quality. Quality Mode provides approximately one million character yield; Save Mode provides approximately three million character yield.

Customer Setup (CSU) and Responsibilities: The 5217 is designated a customer setup machine. The marketing representative must advise the customer of his/her responsibilities before receipt of the machine. For System/23, *Customer Setup Instructions* (SA34-0197) is shipped with the machine. For the 5280, *IBM 5280-5217 Printer Setup and Operator's Guide* (GA23-1016) is shipped with the machine.

CSU allowance is one day (two days when installed concurrently with a 5280).

Physical Planning Information:

Unit	Height	Width	Depth	Weight	Max KVA	BTU /HR
5217 Prtr	200mm 8 in	660mm 26 in	583mm 23 in	26.5 kg 58.4 lb	.50	900
Cut Sheet Feed #7860	284mm 11 in	540mm 21 in	490mm 19 in	11.4 kg 25.0 lb	NA	NA
Continuous Forms Tractor #7850	130mm 5 in	525mm 21 in	498mm 20 in	4.0 kg 8.8 lb	NA	NA

SPECIFY

- Power (AC, 1-Phase): Specify **#0802** for Low Range, (96.5-119V 50 Hz or 96.5-137V 60 Hz) or **#0801** for High Range (193-259V 50 Hz or 193-254V 60 Hz). A power cord is shipped with the machine. The 3-digit WT Country Code will be used to select a power cord and plug of the specifications most commonly used in that country.
- Color: Pearl White only (no specify required).
- Machine Nomenclature: Available at time of manufacture only. This code will also determine the language of the publications shipped with the machine.

English	#2927	Italian	#2932 *
French	#2928	Spanish	#2931
German	#2929		

* Nomenclature only for the 5280. English publications are shipped with the machine.

- One Print Wheel Type Style: One ASCII Courier 10 (P/N 1439652) print wheel is provided with the machine. Additional print wheels may be ordered as supplies by part number.

- 5280 Cable: Specify **#9050** for special attachment cable for use with the 5280.

SPECIAL FEATURES

Printer Switch and Cable Assembly (#5600): Provides a 2-position manually operated switch and cables which permit the connection of any 5217 Printer between any two 5322 or 5324 Computers on an either-or-basis. The Printer Switch Box has two cables, 6 meters (19.8 feet) in length that attach to the computers. The box is marked 1 and 2 and the switch is accessible at the recessed top. The box is 76.2mm x 101.6mm x 38.1mm (3 in. x 4 in. x 1-1/2 in.). For shipment to the field, order by feature number. **Limitations:** Cannot be installed on a 5217 which is attached to a 5280. **Field Installation:** Yes. **CSU:** Yes.

Continuous Forms Feed Device (#7850): Provides a variable-width tractor for feeding continuous forms. This feature is required for successful multi-page printing operations encountered in the system support programs and some application programs. See "Limitations" for Forms Requirements. **Field Installation:** Yes. **CSU:** Yes.

Cut Sheet Feed Device (#7860): Provides for feeding cut sheets of paper from two source trays under System Control. Consists of paper transport and output tray. Paper is stacked face down. See "Limitations" for Paper Specifications. **Field Installation:** Yes. **CSU:** Yes.

TERMS and CONDITIONS

Machine Group: D	Pre-Installation Test Allowance:
Warranty: B	None
Per Call: 2	Volume Purchase Plan: Available
Educational Allowance: Yes.	Pilot Test Plan: Available
CSU: Yes	

MODEL CONVERSIONS: None

ACCESSORIES

Paper Stacker/Tray (P/N 1494596): Permits feeding of continuous forms from a carton and provides for form stacking on a single shelf after printing.

Paper Table (P/N 1495352): Provides paper support and a movable guide for manual cut sheet insertion when no sheet or tractor feed is installed.

Paper Trays (Top P/N 6819687) (Bottom P/N 6819442): Provides additional trays for Cut Sheet Feed Device (#7860). Eliminates paper removal/installation from trays when customer uses a wide variety of papers. Contact IBM for accessory ordering details.

SUPPLIES

Ribbons: The IBM 463 ribbon (P/N 1299463) or equivalent. None required with machine order. Contact IBM for details.

Print Wheels: None required with machine order. Additional print wheels are available in a variety of print styles (see TC 5210 pages in "Type Catalog") and character sets and are interchangeable with the print wheel supplied with the machine. See IBM for details. When ordering, consideration should be given to ordering a second identical wheel for backup. Replacement and installation of the print wheel is the customer's responsibility.

5218 PRINTWHEEL PRINTER

(NO LONGER AVAILABLE)

PURPOSE

A bidirectional, impact printer providing letter quality printed output for the 6580 Displaywriter System, and the 5150 PC, 5160 PC XT (English language only). Printwheels in 10 pitch, 12 pitch, 15 pitch or proportional spacing are available to provide a selection of type style variations. With the proper hardware and software, each printer can also be used in a clustered system, supporting up to three 6580 workstations and up to four IBM PC workstations.

Note: The proportional spacing in a 5218/5150 PC-5160 PC XT environment will not be available until May, 1984.

MODELS

Model A01: 40 cps Features, Accessories and RPQs are available.

Model A02: 60 cps

Model A03: 40 cps: Includes support for Front Exit Sheet

Model A04: 60 cps: Includes support for Front Exit Sheet and Envelope devices.

Prerequisites for 5218/6580 Environment: In order for two or three workstations to share a printer, the primary workstation must have the Printer Sharing Prerequisite installed, and each workstation must have Textpack 2, 4, or 6 with the respective memory requirement.

Prerequisites for 5218/5150 PC, 5160 PC XT Environment: (English language only). For attachment of a 5218 (mdis A03 or A04) to the 5150 PC or 5160 PC XT, either in single system or printer sharing environment, an IBM ASCII Printwheel is necessary for each printer. See "Specify" and "Special Features" below.

Note: The 5218 will require an enclosure for use in any environment requiring Modification Features. See "Accessories" below.

The Automatic Paper Handling Prerequisite feature (#1200) is standard on 5218 machines shipped from the plant on or after June 9, 1983.

Physical Planning Information:

Unit	Height	Width	Depth	Weight	Max KVA	BTU /HR
5218 Printer	200mm 8 in.	660mm 26 in.	583mm 23 in.	26.5kg 58.4 lb.	0.50	900
With Sheet Feed Paper Handler	484mm 19 in.	660mm 26 in.	725mm 29 in.	11.4kg 25.0 lb.	NA	NA
With Front Exit Sheet Feed	522mm 20.7 in.	660mm 26 in.	902mm 35.5 in.	38.6kg 85.4 lb.	NA	NA
With Front Exit Sheet and Envelop Feed	522mm 20.7 in.	660mm 26 in.	902mm 35.5 in.	40.6kg 88.4 lb.	NA	NA
With Tractor Feed	330mm 13 in.	660mm 26 in.	735mm 29 in.	4.0kg 8.8 lb.	NA	NA

HIGHLIGHTS

Highlights in a 5218/6580 Environment:

- Rated burst print speed of up to 40 cps (mdl A03) or 60 cps (mdl A02, A04) (assumes 96-character set with 10 pitch).
 - Accommodates horizontal character spacing of 10 pitch, 12 pitch, or 15 pitch, and proportional spacing according to the printwheel selected.
 - Vertical spacing is program selectable in increments of 0.26mm (1/96 in., 0.0104 in.). For a single program command, the vertical movement is 4 increments minimum and 24 maximum. This permits line spacing from 4 lines/inch to 24 lines/inch.
- The printer will default to 6 lines/inch if the user does not program-select a vertical line spacing.
- The lines per page parameter is also program-selectable, the default being 66 lines per page.
- Single-speed carriage with skipping at up to 6 inches per second.
 - Single sheet feeding by hand, or the optional Sheet Feed Paper Handler.

- Automatic Envelope Feeding by the optional Front Exit Sheet and Envelope Feed Attachment.
- Ribbon switch allowing one million or three million character yield selection. (mdis A03, A04.)
- Forms tractor for feeding continuous forms is an optional feature.
- Multiple 96-character printwheel options available by type style and language graphic variations. (See "Supplies" below.)

Highlights in a 5218/5150 PC, 5160 PC XT Environment:

- Rated burst print speed of up to 40 cps (mdl A03) or 60 cps (mdl A04) (assumes 96-character set with 10 pitch).
 - Accommodates horizontal character spacing of 10 pitch, 12 pitch, or 15 pitch, and proportional spacing according to the printwheel selected.
- Note:** Proportional Spacing Printwheels will not be available until May, 1984.
- Vertical spacing is program selectable in increments of 0.52mm (1/48 in., 0.0208 in.). For a single program command, the vertical movement is one increment minimum and 255 maximum.

The printer also support vertical spacing in increments of 0.35mm (1/72 in., 0.0138 in.). When this base increment is active, vertical movement is restricted 12 increments (6 lines per inch) and 9 increments (8 lines per inch). Other incremental selections may cause loss of form registration.

- Single sheet feeding by hand.
- Automatic Sheet and Envelope Feeding with the optional Front Exit Sheet and Envelope Feed Attachment.
- The printer will supports up to four 5150 PCs or 5160 PC XT's with auto polling of the P/C's workstations.
- Forms tractor for feeding continuous forms is an optional feature. With device #4471 installed operator intervention is required to assure proper paper alignment prior to printing.
- Printwheel selection is limited to the ASCII character set. See "Supplies" below.

Customer Setup (CSU) and Responsibilities: The 5218 is designated a customer setup machine. The marketing representative must advise the customer of his/her responsibilities before receipt of the machine. Customer Setup Instructions are shipped with the machine. CSU allowance is one day.

Limitations:

1. **Character Sets:** The 5218 Printer may utilize any one of a variety of 96-character type wheels on any particular printing operation in a 5218/5580 environment. For 5218/5150 PC or 5160 PC XT attachment (English language only), the 5218 supports the US ASCII 96-character printwheel. However, through programming any one of a variety of 96 character printwheels may be used. See "Guide to Operation IBM 5218 Printer Driver Program and Printer Sharing Device", G570-2063-0, P/N 6113655.

It is the customer's responsibility to match the type wheel selected to the printing requirements.

2. **Continuous Forms:**

Pinfeed continuous forms can be used. (See "Special Features" for Tractor Feed device.) In a 5218/5150 PC or 5160 PC XT environment (English language only) with device #4471 installed operator intervention is required to assure proper paper alignment prior to printing.

Both edges of the pinfeed forms must be fastened in the forms tractors.

No staples are permitted in the areas exposed to the interchangeable printwheel.

Printer operation and print quality vary with paper and number of copies. Multiple part forms should be tested in operating conditions to verify that results are satisfactory.

3. **Paper Specifications:**

Maximum carbons is five
Maximum paper width is 392mm (15.4 in.)
Maximum pin-to-pin width on forms tractor is 368mm (14.5 in.)
Maximum print-line width is 335mm (13.2 in.)

Single sheet feed is by hand insertion, unless the optional Sheet Feed Paper Handler (#7860) (NO LONGER AVAILABLE) or Front Exit Sheet Feed (#7870), or Front Exit Sheet and Envelope Feed (#7875) is used. Multi-page printing with single sheet feeding requires operator intervention. Note: In a 5218/5150 PC or 5160 PC XT environment (English language only), the Sheet Feed Paper Handler (#7860) (NO LONGER AVAILABLE) is not supported.

4. **Paper Recommendations:**

Suitable Paper

All of the papers placed in the Sheet Feed Paper and Front Exit Sheet and Envelope Feed should be new, unused and

without packaging damage. To ensure feed reliability all papers should be "riffled" or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the Sheet Feed Paper and Front Exit Sheet and Envelope Feed.

Type and Composition: Plain bond paper of one of the following compositions.

- No. 1 sulfite (100% chemical wood pulp).
- 25% cotton content.
- 50% cotton content.
- 100% cotton content.
- Paper made from recycled office paper.

Size: The following paper sizes can be fed either lengthwise or sideways unless otherwise noted.

178mm x 267mm	*	(7.0 in. x 10.5 in.)
185mm x 267mm	*	(7.25 in. x 10.5 in.)
191mm x 267mm	*	(7.5 in. x 10.5 in.)
203mm x 267mm	*	(8.0 in. x 10.5 in.)
203mm x 330mm	*	(8.0 in. x 13.0 in.)
216mm x 279mm	*	(8.5 in. x 11.0 in.)
216mm x 330mm	*	(8.5 in. x 13.0 in.)
216mm x 356mm	*	(8.5 in. x 14.0 in.)

* Feed lengthwise only.

Basic weights:

- 60g/sq.m to 90g/sq.m (16 lb. to 24 lb.)
- Optimum: 75g/sq.m to 90g/sq.m (20-24 lb. bond) 25% or 50% cotton content.

Unsuitable Paper for the cut sheet feeders

Following is a list of paper supplies that may be found in an office that will not feed reliably and may cause misfeeds and paper jams. (This list is not intended to be all-inclusive.)

- Coated paper.
 - Vellum paper.
 - Coated erasable bond paper.
 - Synthetic papers (rice paper, parchment, etc.).
 - Translucent paper.
 - Multi-sheet forms and documents (bound or unbound).
 - Peel-off, pressure-sensitive labels.
 - Some types of chemically-treated papers (such as paper used to make copies without carbon paper).
 - Preprinted forms requiring a high degree of character placement accuracy.
 - Dark colored paper.
 - Envelopes.
 - Card stock.
 - Folded or creased documents.
 - Paper with exposed gummed surfaces, holes, perforations, cutouts, or windows.
 - Highly embossed paper (embossment height exceeding 0.508mm (0.02 in.).
- Note:** Embossments should not be located within 15mm (0.59 in.) of any edge of the sheet.
- Preprinted papers containing chemicals or substances that leave a residue on the Sheet Feed Paper Handler or printer components.

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- A mix of different sizes and types of paper in a paper tray.
- Paper in unsatisfactory conditions:
 - Paper with excessive curl or waviness (exceeding 3mm (0.118 in.)).
 - Reams of paper with edges or corners folded or bonded together (fluffing may correct this condition).
 - Paper with poorly cut (rough) edges.

Note: Paper should not be exposed to adverse temperature or humidity conditions (consult the paper manufacturer for recommended storage environment).

5. Envelope Recommendations:

Suitable Envelopes

Envelope feeding characteristics vary with the type, sizes, and weight of envelopes used. All of the envelopes placed in the Front Exit Sheet and Envelope Feed should be new, unused and without packaging damage. The envelopes defined in this section are the only ones considered acceptable for use in the Front Exit Sheet and Envelope Feed.

Type and Composition: US plain bond envelopes of one of the following compositions.

- No. 1 sulfite (100% chemical wood pulp).
- 25% cotton content.
- 50% cotton content.
- 100% cotton content.
- Paper made from recycled office paper.
- White envelopes.

World Trade Envelopes:

- Well-sized boxed paper with non-coated surface.

Size: The following US standard envelopes sizes can be fed:

- #7-3/4 98.4mm x 190.5mm (3.875x7.5 in.)
- #9 98.4mm x 225.4mm (3.875x8.875 in.)
- #10 114.8mm x 241.3mm (4.5x9.5 in.)

The size of World Trade envelopes which can be fed range from 98.4mm to 114.8mm (3.875 in. to 4.5 in.) in width and 190.5mm to 241.3mm (7.5 in. to 9.5 in.) in length.

Basic weights:

Optimum: 70g/sq.m (20 lb.) sulfite or 25% cotton content plain bond envelopes.

Unsuitable Envelopes:

Following is a list of envelopes supplies that may be found in an office that will not feed reliably and may cause misfeeds and envelopes jams. (This list is not intended to be all-inclusive.)

- Window envelopes.
- Envelopes with holes, perforations, cut out or deep embossing.
- Envelopes with side flaps, i.e., flaps that fold along the the
- short dimension of the envelope.
- Envelopes with flaps that extend more than 60mm (2.36 in.) beyond the line of the fold.
- Envelopes that are stuck together.
- Envelopes that will not stack flat.
- Envelopes that are damaged or bent so that they are interlocked.

Paper and envelope capacity for automatic paper handling options: Each paper source drawer holds 200 sheets and the exit tray holds 400 sheets. The envelope source and exit

hopper holds 100 envelopes each. Quantities are approximate and may vary depending on paper weight.

SPECIFY

- For 5218 Printers attached to 6580 Displaywriter, specify #9202.
- For 5218 Printers attached to 5150 PC or 5160 PC XT (English language only) specify #9203.
- Power (AC, 1-Phase): Specify #0802 for Low-Range (90-140V/50 and 60 Hz), or #0801 for High-Range (180-240V/50 and 60 Hz).

A power cord is shipped with the machine. The 3-digit Country Code will be used to select a power cord and plug of the specifications most commonly used in that country.

- Cable Lengths (required cable for 5218 to 6580 Workstation): Cables in lengths of 3, 6, 30, and 60 meters (9.9, 19.7, 98.4 and 196.8 ft.) can be ordered to cable connect the 5218 to a workstation. One cable is required for either a stand-alone or printer-sharing configuration. 3m (9.9 ft.) cable (#2030), 6m (19.7 ft.) cable (#2000), 30m (98.4 ft.) cable (#2010), 60m (196.8 ft.) cable (#2020). The 6m (19.7 ft.) cable is standard unless otherwise specified. If no cable is desired, use #3999.
- Cable for 5150 PC or 5160 PC XT attachment: Specify #3999. No workstation attach cable is shipped with the 5218 printer when it is attached to the 5150 PC or 5160 PC XT. The workstation attach cable is then contained in the 5218 Printer-PC Attachment Convenience Pack (#4470). See "Special Feature" below.
- Color: Pearl White only (no specify required).
- Machine Nomenclature: Available at time of manufacture only. This code will also determine the language of the publications shipped with the machine.

English #2927 Spanish #2931
French #2928

Printwheel Type Style: One standard printwheel is shipped with the machine except as outlined below:

(Except Canada > All countries: Prestige Elite 12, no specify required. <)

(Canada only > Specify #2978 for Prestige Elite 12 Canada/English or #2977 for Prestige Elite 12 Canada/Bilingual. <)

All countries, English language only. When attached to a 5150 PC or 5160 PC XT, one Courier 10 ASCII printwheel is also attached.

Additional printwheels may be ordered as supplies by part number. See "Supplies" below.

SPECIAL FEATURES

Automatic Paper Handling Prerequisite (#1200): Required for 5218 printwheel printers in order to install Sheet Feed or Tractor Feed paper handlers. Field Installation: Yes. CSU: No.

Note: The Automatic Paper Handling Prerequisite feature (#1200) is standard on 5218 machines shipped from the plant on or after June 9, 1983.

5218 Printer-PC Attachment Convenience Pack (#4470): Includes the attachment cable and Guide to Operations IBM 5218 Printer Driver Program and Printer Sharing Device, G570-2063. The attachment cable is 6.0 meters (19.7 ft.) in length. For customers who wish to procure alternate attachment cable lengths (unavailable through IBM) refer to "Guide to Operations IBM 5218 Printer Driver

Program and Printer Sharing Device", G570-2063. Field Installation: Yes. CSU: Yes. #4470 should be ordered as PC option

5218 Printer-PC Sharing Feature (#4471): This feature allows two to four 5150 PC or 5160 PC XT Computers in any combinations to share one 5218 Printer in a cluster system. Prerequisites: One feature #4470 is required for each attaching PC, and an IBM ASCII printwheel is necessary. Field Installation: Yes. CSU: Yes. #4471 should be ordered as PC option

5218 Printer Driver Program #4472: For use with the 5150 PC or 5160 PC XT. It also includes "Guide to Operations IBM 5218 Printer Driver Program and Printer Sharing Device", G570-2063. Field Installation: Yes. CSU: Yes. #4472 should be ordered as PC option

Tractor Feed Device (#7850): Provides a variable-width tractor for feeding continuous forms. This feature is advantageous for successful multi-page forms printing operations. See "Limitations" for forms requirements. Field Installation: Yes. CSU: Yes. With device #4471 installed operator intervention is required to assure proper paper alignment prior to printing.

Sheet Feed Paper Handler (#7860): (NO LONGER AVAILABLE) Provides for feeding cut sheets of paper from two source trays. Consists of paper transport and output tray. Paper is stacked face down. See "Limitations" for paper specifications. Field Installation: Yes. CSU: Yes.

Front Exit Sheet Feed (#7870): Provides for feeding cut sheets of paper from two source trays under system control. Consists of paper transport and output tray. Paper is stacked face down. Field Installation: Yes. CSU: Yes. See "Limitations" for paper specifications. Must have cable adapter for use with mdl A02. Cable adapter is shipped with printer or with Front Exit Sheet Feed if ordered for field installation.

Front Exit Sheet And Envelope Feed (#7875): Provides for feeding cut sheets of paper from two paper source trays and envelopes from separate source tray under system control. Consists of paper transport and separate output trays for sheets and envelopes. Paper is stacked face down. Field Installation: Yes. CSU: Yes, mdls A03 and A04 only. Prerequisites: Level G update of Textpack 4 or Textpack 6.

Field Conv. Envelope Feed Capab. to Front Exit Sheet Feed (#7876): (Mdls A03, A04) Field Installation: Only. Prerequisites: Must have #7870 installed and Level G update of Textpack 4 or Textpack 6.

Field Conv. Envelope Feed Capab. to Front Exit Sheet Feed (#7877): (NO LONGER AVAILABLE)

(Mdl A02) Field Installation: Only. Prerequisites: Must have #7870 installed and Level G update of Textpack 4 or Textpack 6.

Front Exit Sheet And Envelope Feed (#7878): (NO LONGER AVAILABLE)

(Mdl A02) Provides for feeding cut sheets of paper from two paper source trays and envelopes from separate source tray under system control. Consists of paper transport and separate output trays for sheets and envelopes. Paper is stacked face down. Field Installation: Only. CSU: No. Prerequisites: Must have cable adapter which is shipped with this feature and Level G update of Textpack 4 or Textpack 6.

MODEL CONVERSIONS

(NO LONGER AVAILABLE)
 60 cps (A02). A03 to A04 not offered.

ACCESSORIES

Cable Adapter (P/N 4749559): Provides capability to connect Sheet Feed Paper Handler (#7860) (NO LONGER AVAILABLE) to the 5218

mdls A03 and A04. Note: Not applicable when attached to a 5150 PC or 5160 PC XT.

Paper Trays (Top P/N 6819687) (Bottom P/N 6819442): Provides additional trays for Sheet Feed Paper Handler (#7860) (NO LONGER AVAILABLE) Nor Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875). Eliminates paper removal/installation from trays when customer uses a wide variety of papers.

Paper Stacker/Tray (P/N 1494596): Permits feeding of continuous forms from a carton and provides for form stacking on a single shelf after printing.

Paper Table (P/N 1495352): Provides paper support and a movable guide to assist manual cut sheet insertion where no sheet or tractor feed is installed. Contact IBM for ordering details.

5218 Printer Information Protection Enclosure (P/N 4782695): Designed to help protect information being printed by a Tempest-modified Displaywriter with the 5218 mdl A02 printer with serial numbers between 26-31628 and 26-62013, with or without an optional Sheet-Feed Paper Handler (#7860) (NO LONGER AVAILABLE). It is a floor-standing steel module. The Enclosure is approximately 1.72m (50 in.) high, 86.4cm (34 in.) wide, 99.1cm (39 in.) deep. It weighs approximately 272kg (600 lbs.) and is equipped with casters to assist in moving. A front-mounted door provides access for printer service. Data security requires that the Enclosure door be completely closed during printer operation. Door closing is the customer's responsibility. A data signal cable and power cable are included for internal attachment of the printer to the Enclosure. A 6m printer cable is provided for external connection of the Enclosure to the Displaywriter System. Electrical support is limited to printwheel printers with 110V, 60 Hz power supply. The Enclosure is not designed to accommodate the Tractor Feed Paper Handler or the 5228 Wide-Carriage Printwheel Printer. Warranty: These Enclosures are available only on a purchase basis. Installation, check-out, and maintenance will not be provided by IBM and expenses involved will be paid by the customer. For 90 days commencing on the date of installation or 120 days after shipment, whichever comes first, the Enclosure is warranted free from defect in materials and workmanship. IBM's obligation is limited to providing replacement parts on an exchange basis. Service information including aids, diagnostics, and part numbers are included with the Enclosure. Limitations: The Enclosure is approved for operation only with 5218 mdl A02 printers with serial numbers between 26-31628 and 26-62013. Ordering Instructions: Order via MSORDER (category = Supplies/Accessories). Allow a lead time of 90 days. Prior to order acceptance, the Marketing Representative must contact Federal Schedule Contracts, Bethesda, Md., for instruction regarding additional Special Terms and Conditions which apply to Information Protection and which must be included in customers order. Order RPO S90051 with the 5218 mdl A02 to ensure that a printer with an approved serial number is shipped. (NO LONGER AVAILABLE) Delivery Instructions: The Enclosure is shipped via padded van F.O.B. at the vendor (shipping charges collect) to the delivery point designated by the customer. Shipment can not be designated to an APO or FPO. Damage claims against the carrier are the customer's responsibility.

Attachment Cable (P/N 6113647): Provides the connection of 5218 and 5150 PC or 5160 PC XT or the Printer Sharing Feature (#4471).

SUPPLIES

Ribbons: The IBM 463 ribbon (P/N 1299463) or equivalent. None required with machine order. See your Country DP Supplies Coordinator. Contact IBM.

Printwheels: None required with machine order. Additional printwheels are available in a variety of print styles, and character sets, see "Type Catalog" - 5210, and are interchangeable with the printwheel supplied with the machine. When ordering, consideration should be given to ordering a second identical wheel for backup. Replacement and installation of the printwheel is the customer's responsibility. See your Country DP Supplies Coordinator. Contact IBM for ordering instructions.

5219 PRINTER

PURPOSE

A bidirectional impact printer providing letter quality output for the 5520 Administrative System, S/1, S/34, S/36, S/38, and 5251 models 2 or 12 Information Display Station. May also be attached to the 5294 workstation controller. See M5294 pages for workstation attachment limitations. Printwheels in 10 pitch, 12 pitch, 15 pitch, or proportional spacing are available to provide a selection of type style and graphic variations.

MODELS

Model B01: (NO LONGER AVAILABLE)

40 cps. Attaches to the 5520 Administrative System

Model B02: 60 cps. Attaches to the 5520 Administrative System

Model D01: (NO LONGER AVAILABLE)

40 cps. Attaches to the S/1, S/34, S/36, S/38, and the 5251 models 2 or 12 Information Display Station. May also be attached to the 5294 workstation controller. See M5294 pages for workstation attachment limitations.

Model D02: 60 cps. Attaches to the S/1, S/34, S/36, S/38, and the 5251 models 2 or 12 Information Display Station. May also be attached to the 5294 workstation controller. See M5294 pages for workstation attachment limitations.

Limitations:

- Continuous forms:

Pin-fed continuous forms can be used. (See "Special Features" for forms stand and Continuous Forms Feed Device.) Both edges of the pin-fed forms must be fastened in the forms tractors. No staples are permitted in the areas exposed to the interchangeable printwheel.
- Printer operation and print quality vary with paper and number of copies. Multiple part forms should be tested in operating conditions to verify that results are satisfactory.
- Single sheet feed is by hand insertion, unless the optional Cut Sheet Feed Attachment (#7860) (NO LONGER AVAILABLE) or Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875) is used. Mdls B01 and B02 require attachment via the Auto Paper Handling Prerequisite (#1200).
- There is a limit on the number of permissible cable "junctions" on the cable used to attach multiple 5219 and 5258 Printers to the 5525 System Unit. See the "5520 Administrative Systems Installation Manual - Physical Planning" (GA23-1011) for details. The manual also describes the limits on total number of printers attachable to the 5525, and multidrop limits on a single line. For 5219 mdls D01 or D02, see "IBM 5250 Information Display Systems Planning and Site Preparation Guide" (GA21-9337), and "Series/1 Customer Site Preparation Manual" (GA34-0050).
- Paper specifications:
 - Maximum paper width 392mm (15.4 in.)
 - Maximum pin-to-pin width on forms tractor 368mm (14.5 in.)
 - Maximum print-line width 335mm (13.2 in.)
 - Maximum print-line depth 533mm (21 in.)
- Cut Sheet Feed, and Front Exit Sheet and Envelope Feed Attachment paper recommendations:

Suitable paper:

All of the papers placed in the Cut Sheet Feed, and Front Exit Sheet and Envelope Feed Attachments should be new, unused, and without packaging damage. To ensure feed reliability, all papers should be riffled or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the sheet feed attachments.

Type and composition: Plain bond paper of one of the following compositions:

- No. 1 sulfite (100% chemical wood pulp)
- 25% cotton content
- 50% cotton content
- 100% cotton content
- Paper made from recycled office paper

Size: The following paper sizes can be fed only lengthwise unless otherwise noted:

178mm x 267mm (7.0 in. x 10.5 in.)
 185mm x 267mm (7.25 in. x 10.5 in.)
 191mm x 267mm (7.5 in. x 10.5 in.)
 203mm x 267mm (8.0 in. x 10.5 in.)*
 203mm x 330mm (8.0 in. x 13.0 in.)
 216mm x 279mm (8.5 in. x 11.0 in.)*
 216mm x 330mm (8.5 in. x 13.0 in.)
 216mm x 356mm (8.5 in. x 14.0 in.)

* Can be fed lengthwise or sideways.

● Basis weights:

- 60g/sq.m to 90g/sq.m (16 pound to 24 pound)
- Optimum: 75g/sq.m to 90g/sq.m (20-24 pound bond) 25% or 50% cotton content

● Unsuitable paper:

Following is a list of paper supplies that may be found in an office that will not feed reliably and may cause misfeeds and paper jams. (This list is not intended to be all-inclusive.)

- Coated paper
- Vellum paper
- Coated erasable bond paper
- Synthetic papers (rice paper, parchment, etc.)
- Translucent paper
- Multi-sheet forms and documents (bound or unbound)
- Peel-off, pressure-sensitive labels
- Some types of chemically treated papers (such as paper used to make copies without carbon paper)
- Preprinted forms requiring a high degree of character placement accuracy
- Dark colored paper
- Envelopes
- Card stock
- Folded or creased documents
- Paper with exposed gummed surfaces, holes, perforations, cutouts, or windows

- Highly embossed paper - embossment height exceeding 0.508mm (0.02 in.). Note: Embossments should not be located within 15mm (0.59 in.) of any edge of the sheet.
- Preprinted papers containing chemicals or substances that leave a residue on the Cut Sheet Feed Attachment or printer components.
- A mix of different sizes and types of paper in a paper tray.
- Paper in unsatisfactory condition: Paper with excessive curl or waviness, exceeding 3mm (0.118 in.); reams of paper with edges or corners folded or bonded together (fluffing may correct this condition); and paper with poorly cut (rough) edges. Note: Paper should not be exposed to adverse temperature or humidity conditions. (Consult the paper manufacturer for recommended storage environment.)

● Character Sets:

The 5219 Printer may utilize any one of a variety of 96-character type wheels on any particular printing operation. It is possible that some characters which appear on a display or display keyboard cannot be printed with the type wheel mounted on the printer. For example, special characters may differ between word processing printwheels and data processing printwheels, or the same character may appear in different printwheel positions. It is the customer's responsibility to match the type wheel selected to the printing requirements.

● Envelope Recommendations:

Suitable Envelopes:

Envelope feeding characteristics vary with the type, size, and weight of envelopes used. All of the envelopes placed in the Front Exit Sheet and Envelope Feed should be new, unused and without packaging damage. The envelopes defined in this section are the only ones considered acceptable for use in the Front Exit Sheet and Envelope Feed.

Type and Composition: Well sized bond paper with non-coated surfaces.

Size: The size of envelopes that can be fed range from 98.4mm to 114.8mm (3.875 to 4.5 in.) in width and 190.5mm to 241.3mm (7.5 to 9.5 in.) in length.

Basis Weight:

- Optimum: 75g/sq.m (20 pound) sulfite or 25% cotton content plain bond envelopes.

● Unsuitable Envelopes:

Following is a list of envelope supplies that may be found in an office that will not feed reliably and may cause misfeed and and envelope jams. This list is not intended to be all inclusive.

- Window envelopes
- Envelopes with holes, perforations, cutouts or deep embossing
- Envelopes with side flaps, i.e., flaps that fold along the short dimension of the envelope
- Envelopes with flaps that extend more than 60mm (2.36 in.) beyond the line of the fold

Unsuitable Envelope Conditions:

- Envelopes that are stuck together
- Envelopes that will not stack flat
- Envelopes that are damaged or bent such that they are interlocked.

Prerequisites: In the 5525 System Unit, Local Device Control (#4710, #4711, #4712); LDC Attachment (#4715); and either #1105, #1700, #1701, #1702, or #1704. See M5525 pages for details. In the S/1

system, #5640 and an available position in a 4952, 4954, 4955, or 4956 Processor, the 4959 Input/Output Expansion Unit or the 4965 Diskette Drive and Input/Output Expansion Unit.

Customer Setup (CSU): The 5219 is designated as a Customer Setup device, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, refer to the GI section. The marketing representative must advise the customers of their responsibilities before receipt of the machine.

HIGHLIGHTS

- Mdl's B01 and D01 have a rated burst print speed of up to 40 cps (assumes 96-character set with 10 pitch). Mdl's B02 and D02 have a rated burst print speed of up to 60 cps (assumes 96-character set with 10 pitch).
- Accommodates horizontal character spacing of 10 pitch, 12 pitch, 15 pitch (maximum 172-character line), or proportional spacing, according to the print wheel selected. S/34 and S/36 SSP support 10 pitch character spacing only. S/38 CPF supports 10, 12, and 15 pitch character spacing. The S/38 CPF does not support proportional spacing.
- Vertical spacing of 5-1/3, 6, or 8 lines per inch. S/34 SSP and S/36 SSP support six lines per inch only. S/38 CPF supports six or eight lines per inch only.
- Half-line spacing for superscripts and subscripts to a single level. S/34 and S/36 SSP and S/38 CPF do not support these functions.
- First line registration, form skipping, and spacing chosen by the user and then controlled by the licensed program.
- Single speed carriage with skipping at up to six in. per second.
- Noise level consistent with an office environment.
- Ribbon saver facility permits two modes of ribbon feed, to extend ribbon life where appropriate.
- Single sheet feeding by hand, or the optional Cut Sheet Feed or Front Exit Sheet Feed or Front Exit Sheet and Envelope Feed Attachments. Mdl's B01 and B02 require Auto Paper Handling Prerequisite (#1200).
- Forms tractor for feeding continuous forms is optional. Mdl's B01 and B02 require Auto Paper Handling Prerequisite (#1200).
- Multiple 96-character print wheel options available by type style and language graphic variations. See the "Supplies" section.
- Optional Paper Stacker Tray.
- Standard cable-thru capability to allow multiple printers on a single cable at up to a cumulative total of 1,524 cable-meters (5,000 cable-feet) radially from the system unit or workstation. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and 5252 devices require twinaxial cable.
- The printer may be attached to the 5525 System Unit, S/36, S/38, and the 5251 mdl 12 Display Station using shielded twisted-pair cable or twinaxial cable. Twinaxial cable is required for attachment to the 5340, 5251-2, or S/1. For cable length specifications, refer to the "IBM 5520 Administrative System Installation Manual - Physical Planning" (GA23-1011), "IBM 5520 Information Display Systems Planning and Site Preparation Guide" (GA21-9337), or "IBM Cabling System - Planning and Installation Guide" (GA27-3361).
- Customer Setup for early availability and relocation flexibility.

Problem Determination Procedures: Problem determination (and recovery) procedures are provided by IBM with the 5219 Printer. When attached to the 5525 System Unit using Licensed Program 5611-SS1, these procedures will be described in the HELPs and

Messages facilities in the licensed program and in "IBM 5219 Printer Operators Guide" (GA23-1009) and "IBM 5520 Administrative System Messages and Recovery Aids" (SC23-0733 or SC23-0749).

These procedures are designed to be easy to follow and use by the customer, and it is the customer's responsibility to follow them prior to calling for IBM service.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking, and placement of the 5219.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions provided by IBM.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5219.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the branch office.
- Relocation of the 5219, if required, to allow IBM service access.
- Installation and maintenance of signal cables and associated cable adapters for attaching the 5219 to the system unit or workstation.
- When adding or moving 5219 or 5258 Printers on the 5520 Administrative System, the customer may have to modify the system configuration specifications. See the "IBM 5520 Administrative System Installation Manual - Physical Planning" (GA23-1002 or GA23-1011).

Publications

"IBM 5520 Administrative System Introduction" (GC23-0702)
 "IBM 5520 Administrative System Installation Manual - Physical Planning" (GA23-1011)
 "IBM System/34 Introduction" (GC21-5153)
 "IBM System/34 Installation Manual - Physical Planning" (GA21-9242)
 "IBM System/34 Planning Guide" (GC21-5154)
 "IBM System/34 Installation and Modification Reference Manual" (SG21-7689)
 "IBM System/36 Setting Up Your Computer" (SA21-9430) "IBM System/36 Planning for System Configuration" (SA21-9440)
 "IBM System/36 - Preparing a Place for Your Computer" (SA21-9444)
 "Planning for System Configuration" (SA21-9440)
 "Changing Your System Configuration" (SA21-9052)
 "IBM System/36 - 5362 Planning a Place for Your Computer" (SA21-9475)
 "Planning for System Configuration" (SA21-9483)
 "IBM System/38 Introduction" (GC21-7728)
 "IBM 5250 Information Display System Introduction" (GA21-9246) "IBM Information Display System Planning and Site Preparation Guide" (GA21-9337)
 "IBM Cabling System - Planning and Installation Guide" (GA21-3361)
 "Series/1 Printer Attachment - 5200 Series/1 Description" (GA34-0242)
 "Series/1 Customer Site Preparation Manual" (GA34-0050)
 "Series/1 Pocket Digest" (GX34-0104)
 "Series/1 Digest" (GA60-0061)
 "IBM 5219 Printer Model D01 and D02 Programmer's Reference Guide" (GA23-1025)

SPECIFY

- Power (AC, 1-phase): Specify #0802 for Low Range (96.5-119V AC, 50 Hz or 96.5-137V AC, 60 Hz) or #0801 for High Range (193-259V AC, 50 Hz or 193-254V AC, 60 Hz). A power cord is shipped with the machine. The 3-digit country code in the machine order sheet will be used to select a power cord and plug of the specifications most commonly used in that country.

- Color: Pearl White only (no specify required).
- Machine Nomenclature: Available at time of manufacture only. Specify one. This will select the language of the operator control panel and the customer setup procedures/operator's guide.

English	#2927
French	#2928
German	#2929
Italian	#2932
Spanish	#2931 *

* Available for mdls D01 and D02 only.

- Print Wheels: (Mdls B01, B02) One standard print wheel is shipped with the machine.

As of December 1, 1983, no specify required except as shown below:

All countries Prestige Elite 12

Canada must specify either:

Canada/
Bilingual Prestige Elite 12 #2977

or

Canada/
English Prestige Elite 12 #2978

Additional print wheels may be ordered as supplies by part number. See "Supplies" below.

- Print Wheels: (Mdls D01, D02) One Courier 10 print wheel will be shipped with each unit. The printer will be preset at the manufacturing plant for the selected character set (field changes must be made by a CE). Additional print wheels may be ordered by P/N --- see "Supplies". Specify one.

Country Designations:

Brazil	#2975
Canada Bilingual	#2977
English US	#2956
France	#2964
Germany	#2957
Italy	#2968
Japan	#2955
Portuguese	#2959
Spain	#2960
Spanish Speaking	#2969

- Cables: Customer-supplied (mdls B01, B02); see "Accessories", the "IBM 5520 Administrative Systems Installation Manual - Physical Planning" (GA23-1011), and the "IBM Local Area Network Cabling System - Planning and Installation Guide" (GA27-3361) for ordering information. Specify #9050 if cable is ordered from IBM or #9055 if cable is ordered from another supplier. For mdls D01 and D02, see "IBM Information Display System Planning and Site Preparation Guide" (GA21-9337) for ordering information and "IBM Series/1 Customer Site Preparation Manual" (GA34-0050). A 6-meter (20-foot) twinaxial cable (#5780) is available for S/1 attachment.
- Data Rate: (Mdls B01, B02) The data transfer rate is determined by the Local Device Control feature and the 5525 System Unit mdl. Specify #9300 for printers attaching through feature #4710 on the 5525 on mdl 020 or 021; #9305 for printers attaching through feature #4710 on the 5525 mdl 030, 031, or 032; #9315 for printers attaching through feature #4711 or #4712 on any mdl 5525.
- Printers: (Mdls D01, D02) #9561 for printers attached to S/34, #9563 for printers attached to S/38, #9565 for printers attached to S/36.

SPECIAL FEATURES

Auto Paper Handling Prerequisite (#1200): (Required for mdl B01 and B02 only shipments starting December 1, 1983) Provides paper path sensors and electrical connector for Continuous Forms Feed Device (#7850) or Cut Sheet Feed Attachment (#7860) (NO LONGER AVAILABLE) or Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875). Field Installation: Yes.

Continuous Forms Feed Device (#7850): Provides a variable-width tractor for feeding continuous forms. Field Installation: Yes. Customer Setup: Yes. Prerequisites: Mdls B01 and B02 must have #1200 installed.

Cut Sheet Feed Attachment (#7860): (NO LONGER AVAILABLE) Provides cut sheet paper from two source trays under system control, paper transport, and output tray. Note: The S/34 SSP and the S/38 CPF support one source tray only. Field Installation: Yes. Customer Setup: Yes. Prerequisites: Mdls B01 and B02 must have #1200 installed.

Front Exit Sheet Feed (#7870): Provides cut sheet paper from two source trays under system control, paper transport, and output tray. Note: The S/34 SSP, and the S/36 SSP support one source tray only. The S/36 Text Management System (TMS/36) licensed program supports paper selection from both drawers. Field Installation: Yes. Customer Setup: Yes. Prerequisites: Mdls B01 and B02 must have #1200 installed. Must have cable adapter for use with mdls B01, B02, D01, and D02. Cable adapter shipped with printers or with Front Exit Sheet Feed if ordered for field installation.

Front Exit Sheet and Envelope Feed (#7875): Provides cut sheet paper from two source trays and envelopes from a separate source tray under system control, paper transport, and separate output tray for cut sheets and envelopes. Note: The S/34 SSP and the S/36 SSP support one source tray only. The S/38 CPF and Text Management and the S/36 Text Management System (TMS/36) licensed program support paper selection from both drawers and envelope hopper. Field Installation: Yes. Customer Setup: Yes. Order for all mdls D01/D02 and mdls B01/B02 above serial number 07399. Prerequisites: Mdls B01 and B02 must have #1200 installed. Must have cable adapter for use with mdls B01, B02, D01, and D02. Cable adapter shipped with printers or with Front Exit Sheet and Envelope Feed attachment if ordered for field installation.

Field Conversion (#7876): Field conversion to add envelope feed capability to the Front Exit Sheet Feed (#7870). Field Installation: Yes. No plant installation. Prerequisites: Mdls B01, B02, D01, and D02 must have #7870 installed. Mdls B01 and B02 must be above serial number 07399.

Field Conversion (#7877) (NO LONGER AVAILABLE): Field conversion to add envelope feed capability to the Front Exit Sheet Feed (#7870). Field Installation: Yes. No plant installation. Prerequisites: Mdls B01, B02, only; must have #7870 installed and serial number must be below 07400.

Front Exit Sheet and Envelope Feed (#7878) (NO LONGER AVAILABLE): Provides cut sheet paper from two source trays and envelopes from a separate source tray under system control, paper transport, and separate output tray for cut sheets and envelopes. For mdls B01 and B02 below serial number 07400. Field Installation: Yes. Customer Setup: No. Prerequisites: Must have cable adapter which is shipped with this feature.

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

Model conversions between B01 and B02 and between D01 and D02 are permitted and field installable. Model conversions between Bs and Ds are not possible.

ACCESSORIES

(Available on Purchase-Only Basis)

Paper Stacker/Tray (P/N 1494596): Permits feeding of continuous forms from a carton and provides for form stacking on a single shelf after printing.

Paper Table (P/N 1495352): Provides paper support and a movable guide for manual cut sheet insertion where no sheet or tractor feed is installed.

Paper Trays: (Top - P/N 6819687, Bottom - P/N 6819442). Provides additional trays for Cut Sheet Feed Attachment (#7860) (NO LONGER AVAILABLE) or Front Exit Sheet Feed (#7870) or Front Exit Sheet and Envelope Feed (#7875). Eliminates paper removal and installation from trays. Contact IBM for ordering details on above accessories.

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for attachment of the 5219. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-Pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM Cabling System - Planning and Installation Guide" (GA27-3361). For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5520 Administrative System Installation Manual - Physical Planning" (GA23-1011). When cable is ordered from IBM specify a date at least four weeks in advance of receiving the machine.

Twinaxial Connector Kit (P/N 7362268):

Includes two connectors. Twinaxial Wire and one connector kit are required for each attachment cable. (Individual connectors P/N 7362229 are available for replacement.)

Twinaxial Wire (P/N 7362211):

Order must specify the desired length. Twinaxial Wire and one connector kit are required for each attachment cable. (This is an indoor/outdoor cable.)

Twinaxial Cable Assembly (P/N 7362267):

Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230):

Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector (P/N 6819750)

One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Note: This station protector is different from those used with displays.

S/1 Attachment Cables: For a description of cable and/or associated parts to attach the 5219 Printer to the S/1 (feature #5640), see "IBM Series/1 Customer Site Preparation Manual" (GA34-0050). Twinaxial cabling for attachment to the 4952, 4954, 4955, 4959, or 4965 (feature #5640):

Device (5219) connector	P/N 7362229
2X4 Berg Connector Kit	P/N 6095524
Twinaxial Cable	P/N 7362211

MACHINES

M 5219.5
SEP 87

SUPPLIES

Ribbons: The IBM 463 ribbon (P/N 1299463) or equivalent. None required with machine order. See your Country DP Supplies Coordinator for details.

Print Wheels: None required with machine order. Additional print wheels are available in a variety of print styles (see TC 5210 pages in "Type Catalog") and character sets and are interchangeable with the print wheel supplied with the machine. When ordering, consideration should be given to ordering a second identical wheel for backup. Contact your Country DP Supplies Coordinator, Contact IBM, for detail listing. Replacement and installation of the print wheel is the customer's responsibility.

5219 Print Wheel Assemblies (Data Processing Character Sets)
(Supported by S/34, S/36, and S/38)

Dscriptns/ Part Nos.	Courier 10	Prestige Pica 10	Artisan 10
-----	-----	-----	-----
Brazil	1439902		1439934
Canadian			
Bilingual	1439910		1439942
French	1439908		1439940
German	1439901		1439933
Italian	1439568	1439584	1439616
Japan			
English	1439911		1439943
Portuguese	1439912		1439944
Spanish/Spanish			
Speaking	1439915		1439947

5223 WHEELPRINTER E

PURPOSE

An impact letter quality printer for attachment to the IBM Personal Computers (PC, PC AT, PC XT, PCjr Parallel Interface, Portable Personal Computer, 3270PC, 3270 PC AT, 3270-PC/G, 3270-PC AT/G, 3270-PC/GX, and 3270-PC AT/GX) and to non-IBM Personal Computers compatible with the IBM Personal Computer Parallel Interface. The Wheelprinter E prints at a burst speed of 16 characters per second. The Wheelprinter E features an optional sheetfeed and an optional pinwheel form feeder.

Note: The 5223 is shipped with a printwheel, a ribbon, and an accessory kit.

The accessory kit contains the "IBM Wheelprinter E Guide-To-Operations", a line cord and a paper table and a tension clip for use with the optional Pinwheel Form Feeder.

The printer attaches to the IBM PC via the IBM PC Printer attach cable (Feature code #5612: P/N 1525612). Attaching the printer to other than the IBM Personal Computer may require a different cable.

MODELS

Model 1 001

Limitations:

- Continuous Forms:

It is not recommended to use continuous paper without the pin-wheel forms feed feature.

Both edges of the pinfeed forms must be threaded.
- Paper Specifications:

Maximum paper width is 381mm (15 in.). Maximum pin to pin width for continuous forms is 368mm (14.5 in.). Maximum print-line width is 335mm (13.2 in.).
- Single Sheetfeed:

Single sheet feed is by hand insertion, unless the optional automatic cut sheet feed feature is used.
- Attachment to other than IBM products may require other than the IBM PC printer cable.

Customer Setup (CSU): The 5223 is designated a customer setup machine. Customer setup instructions are shipped with the machine. The allowance is one day. CSU assistance is available from NSD at the current hourly rate and minimums.

HIGHLIGHTS

- Letter Quality impact printing
- 16 cps burst print speed
- Drop in ribbon cassette
- Optional paper handlers are sheetfeed and continuous pinwheel form feeder.
- Optional sound hood (cannot be used with the optional paper handlers).
- 13.2 inch writing line
- Program selectable vertical spacing in 1/96 inch/line increments

- 8.5 inch wide paper can be fed automatically with the cut sheet feed
- 2.5 inch to 14.5 inch (pin to pin) paper can be fed with the continuous forms feed
- 3 inch to 15 inch wide paper can be manually inserted
- IBM Personal Computer Parallel Interface

Physical Specifications:

Width - 21.3 in.
Depth - 14.4 in.
Height - 8.5 in.
Weight - 29 lbs.

Note: The Wheelprinter E conforms to U.P.S. shipping requirements.

Ordering: The Wheelprinter E (Machine Type 5223) is a type 1 product. Model 001 (5223-001) has an IBM Personal Computer parallel interface.

SPECIFY

- Language: English (No specify required)

PARTS

Paper Tray: (P/N 8655073) Provides additional trays for Sheet Feed Paper Handler.

Line Cord: P/N 1342514

SPECIAL FEATURES

PinWheel Form Feeder: P/N 1341091; Feature #7820

Sheet Feed: P/N 6373100; Feature #7840

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

The Wheelprinter E uses the same supplies as the Wheelwriter(TM) 3 and 5 typewriters. For your convenience they are listed as follows:

- IBM Easystrike(TM) Multipurpose Ribbon Cassette

For use in high-yield general correspondence applications. The Multipurpose Ribbon has an average yield of 440,000 characters and is recommended for offset masters, negotiable instruments and other special applications.

Color	Reorder #
Black	1337764

- IBM Easystrike Correctable Ribbon Cassette

Although there is no correcting feature on the Wheelprinter E, the IBM Easystrike correctable Ribbon is perfect for high-quality correspondence applications. The ribbon has an

average character yield of 150,000 characters and is available as follows:

Color	Reorder #
Black	1337761
Brown	1337762
Blue	1337763

● IBM Easystrike Fabric Ribbon

This ribbon offers long life for draft quality printing applications. The ribbon has a character yield of approximately 1.5 million characters. Actual yield may vary depending on user's quality expectations.

Color	Reorder #
Black	1356000

● IBM Cartridge Printwheel II

Reorder #

1353XXX

The IBM Cartridge Printwheel II is available in all the popular Selectric element type styles and pitches.

Printwheels	Part Number
Courier 15	1353112
Boldface	1353125
Artisan 10	1353105
Gothic 15	1352121
Essay	1353130
Courier 12	1353795
Courier 10	1353909
Letter Gothic	1353110
Prestige Elite	1353101

Note: For a complete listing of reorder numbers and type styles for the IBM Cartridge Printwheel II, refer to the "Supplies Reference Guide for Information Processing Equipment" (G570-2098).

5224 PRINTER MODELS 1, 2

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

PURPOSE

A table-top impact matrix line printer for the 5280 Distributed Data System, S/1, S/34, S/36, and S/38.

MODELS 001 AND 002

Models	Maximum Rated Speeds*	
	10 Chars per inch	15 Chars per inch
Mdl 1 001 (NO LONGER AVAILABLE)	140 lpm	95 lpm
Mdl 2 002 (NO LONGER AVAILABLE)	240 lpm	170 lpm

* For a 18.8cm (7.4 inch) print line.

See "Throughput Considerations" below for print speed factors.

Customer Setup (CSU): The 5224 is a customer setup machine, thereby offering the customer early availability and relocation flexibility. Customer responsibilities are set forth in Information Bulletin for Customers - Customer Setup (G120-2743). CSU allowance is one day. CSU instructions are included with the 5224.

HIGHLIGHTS

The 5224 is an impact matrix line printer of table-top design with characteristics similar to the 5225 printer. A table is not provided with the 5224. The character matrix is eight dots high and seven dots wide. Maximum character height is 2.92mm (0.115 inches). A variety of national character sets are available. Character set selection has no effect on print speed. Upper and lower case is provided in all character sets. See "Type Catalog" for character set arrays. Horizontal print density of 10 or 15 characters per inch (cpi) is operator-selectable. Line spacing of six or eight lines per inch (lpi) is similarly selectable. S/34, S/36, and S/38 Programming supports programmable control of print density and line spacing. Operator selection of density and spacing can optionally be exercised. See "System Attachment" below. The 33.5cm (13.2 inch) print line provides for a maximum of 132 characters at 10 cpi and 198 characters at 15 cpi. Oversize and special characters, logos, business graphics, OCR-A, and bar-code printing can be printed dependent upon host program support. An audible alarm provides an indication to the operator when manual intervention is required due to one of nine printer error conditions. Cable-thru provides the capability of connecting a total of seven multiple 5219s, 5224s, 5225s, 5251 mdl 1 or 11, 5252s, and to a single twinaxial or shielded twisted pair cable. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and 5252 devices require twinaxial cable. Each unit on the cable, except the last, requires this feature. A cartridge ribbon provides for fast, easy and clean ribbon changes. One cartridge ribbon and a ribbon shield, to prevent smudging, are provided with the 5224. A fully adjustable forms tractor provides for feeding margin-punched continuous forms. Up to 4-part forms may be utilized. Forms greater than four parts should be tested for customer acceptance. See "Forms Design Reference Guide for Printers" (GA24-3488) for forms design considerations. Forms skipping and vertical spacing are under program control.

Throughput Considerations: Six factors determine print speed:

1. The mdl of the 5224.
2. The print position of the right-most character in the line being printed.
3. The print density (10 cpi or 15 cpi).
4. Vertical spacing and skipping.
5. Communications and programming considerations.
6. Density (quantity of dots) in each line printed.

3. The print density (10 cpi or 15 cpi).
4. Vertical spacing and skipping.
5. Communications and programming considerations.
6. Density (quantity of dots) in each line printed.

The 5224 maximizes throughput by taking advantage of short line lengths prevalent in most printing. Throughput of mdl 1 is line-length dependent as indicated by the position of the right-most character printed. The mdl 2 is similarly line-length dependent except for the left-most 18.8cm (7.4 inches) of the print line. Any print line 18.8cm (7.4 inches) long or less, as measured from the left, will print at the rate of 240 lines per minute at 10 cpi or 170 lines per minute at 15 cpi. Lines longer than 18.8cm (7.4 inches) will print at a rate reduced in proportion to the number of characters printed beyond 18.8cm (7.4 inches). The mdl 2 has a "design point" of 18.8cm (7.4 inches). A "design point" is not applicable to the mdl 1.

Care in forms design can significantly improve printer throughput. Unnecessary blanks between vertical columns should be avoided. Columns with low data content should be placed to the right of the form. Consideration should be given to print density; 10 or 15 cpi. By redesigning the form for 15 cpi, two-up output may be achieved, thereby improving final throughput.

The 5224 Printer uses an internal print management feature to guard against damaging the printer due to the quantity of dots in a print line. When printing a dense line (a line with a large number of dots), this safeguard may cause the print mechanism to print the line by using multiple passes of the print head. When the printer operates in multi-pass mode, each print line requiring multiple passes is considered to be full length 33.5 cm (13.2 inches). The nominal print speed in multi-pass mode for the mdl 1 is 20 lpm at 10 cpi and 15 lpm at 15 cpi. The mdl 2 in multi-pass mode operates at 25 lpm at 10 cpi and 20 lpm at 15 cpi. The additional time required for multi-pass printing lowers the overall throughput proportionally to the frequency of the dense lines printed.

Although some print lines may contain large quantities of dots (forcing multi-pass printing), usually only repetitive printing of the same character causes multi-pass printing. For example, a series of asterisks or dashes, normally used for highlighting are printed at a lower speed. In printing operations where speed is a primary concern, special techniques can be used to avoid multi-pass printing. For example:

Instead of using	Use
*****	* * * * *
#####	# # # # #
-----	- - - - -

Use of the Load Alternate Character (LAC) command on S/34 or S/36 via the Advanced Printer Function PRPQ, Bar Code Print FDP or other user-generated programs may result in the use of graphics which will result in multi-pass printing. Since print time may vary with each line printed, as line length varies, or due to skipping and spacing, typical customer documents should be benchmarked if specific throughput rates are desired.

The following charts show the relationship of these variable factors in determining print speed.

10 Character Per Inch Print Density

	Mdl 1	Mdl 2
Design Point	N/A	74 Chars 18.8cm (7.4 in.)
Throughput (74-Char Lines)	140 lpm	240 lpm

Maximum (Chars per line)	132	132
Throughput (132-Char Print Line)	90 lpm	120 lpm

15 Characters Per Inch Print Density

	Mdl 1	Mdl 2
Design Point	N/A	111 Chars 18.8cm (7.4 in.)
Throughput (111-Char Lines)	95 lpm	170 lpm
Maximum (chars per line)	198	198
Throughput (198-Char Print Line)	60 lpm	85 lpm
Throughput (132-Char Print Line)	80 lpm	135 lpm

Problem Determination Procedures: Problem determination is aided by significant offline verification tests which have been designed into the printer control unit to provide greater printer availability to the customer. See "IBM 5224 Printer Operator's Guide" (GA34-0092) for procedures.

System Attachment

The 5224 attaches to S/34, S/36, S/38, and the 5280 System in a manner identical to the 5219, 5225, and 5256 printers.

For Direct Attachment to S/34: The 5224 Printer may be attached to S/34 in the following manner:

- When designated as the system printer, the 5224 connects to the workstation controller via one of the four twinaxial cable connectors (ports) on the 5340 System Unit. A 6 meter (20 foot) cable is provided with the 5340. Specify #9308 on the 5340.
- When designated as a local workstation printer, the 5224 attaches in a manner similar to 5250 Information Display System devices.
- Twinaxial cable is required for attachment to the 5340.

See "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337) for cabling information.

Direct Attachment to S/36: The 5224 Printer may be attached to S/36 in a manner similar to 5250 Information Display Station devices. See "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337), for cabling information.

Direct Attachment to S/38: For use as a local workstation printer, the 5224 Printer may be directly attached to the S/38 via the workstation controller features on the 5381. Attachment is by twinaxial or shielded twisted pair cable in a manner similar to the 5225 and 5256 printers. See M5381 pages for workstation controller information.

Remote Printing: For remote printing in a Communications Environment on S/34, S/36, and S/38, the 5224 may be attached to the 5251 mdl 2 or 12 with the Cluster Feature (#2550) or the Dual Cluster Feature (#2551) on the 5251. Twinaxial cable is required for attachment to the 5251-2. May also be attached to the 5294 workstation controller. See M5294 pages for workstation attachment limitations.

5280 Attachment: For Attachment to the 5280 Distributed Data System, the 5285 Programmable Data Station and the 5288 Programmable Control Unit provide for the attachment of the 5224 Printer via twinaxial cable, 1,525 meters (5,000 feet) maximum to the appropriate printer attachment. The prerequisite attachment feature on the

5285 is the Twinaxial Printer Attachment (#1150). The prerequisite attachment feature on the 5288 can be the Single Twinaxial Printer Attachment (#1155); the Multiple Twinaxial Printer Attachment (#1160); or the Multiple Start/Stop-Twinaxial Printer Attachment (#1162). See "IBM 5280 Cable Assembly Manual" (GA21-9341) for cabling information. A maximum of eight printers can be attached to the 5288.

Attachment to S/1: The 4952, 4954, 4955, 4956, 4959 Input/Output Expansion Unit, and 4965 Diskette Drive and I/O Expansion Unit provide for the attachment of the 5224 via the Printer Attachment - 5200 Series (#5640). A 6 meter (20 foot) twinaxial Attachment Cable (#5780), is available. The printer may be attached up to a maximum distance of 1,525 meters (5,000 feet). See "S/1 Customer Site Preparation Manual" (GA34-0050) for cabling information. Twinaxial cable is required for attachment to the S/1.

Publications: The following manuals are included with the 5224 when it is shipped to the customer:

- GA34-0092 IBM 5224 Printer Operator's Guide
- GA34-0093 IBM 5224 Printer Customer Setup Guide

See "Documentation Group" under "Specify".

SPECIFY

- Voltage (AC, 1-phase): Specify one of the following:

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
220V #2803	
240V #9914	

- Color: Pearl White (no specify is required).
- Language Group for Operator Panel: Specify one of the following:

Canadian Fr. #2935	Italian #2932
English #2924	Japanese #2930
French #2928	Spanish #2931
German #2929	

- Documentation Group: For the language of the publications shipped with the machine, one of the following must be specified:

Canadian Fr. #0777	Italian #0768
English #0758	Japanese #0783
French #0764	Spanish #0760
German #0757	

Note: If a publication has not been translated into a national language, the English version will be provided.

- Cables: See "Accessories". For cable specifications, see the "IBM 5250 Information Display Systems Planning and Site Preparation Guide" (GA21-9337), or "IBM 5280 Cable Assembly Manual" (GA21-9341).

- System Attachment: Specify one of the following:

S/1:	
-	#9566
S/34:	
-	#9561 for system printer
-	#9560 for local wkstation printer
-	#9559 for remote wkstation printer
S/36:	
-	#9567 for system printer
-	#9568 for local wkstation printer

MACHINES

- S/38:
 - #9569 for remote wkstation printer
 - #9563 for system printer
 - #9564 for local wkstation printer
 - #9565 for remote wkstation printer
- 5280 System:
 - #9562
- Character Set - 95 print graphics: See "Type Catalog" for character set arrays. Specify one of the following:

Brazilian	#2975
Canadian French	#2977
French	#2964
German	#2957
Italian	#2968
Japanese English	#2955
Japanese Katakana	#2973
Multinational	
(184-Char)	#9470
Portuguese	#2959
Spanish	#2960
Spanish Speaking	#2969
US EBCDIC	#2956

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS

Field installation available. The upgrade purchase prices for model conversions may be greater than the purchase price differentials. Customers should carefully evaluate their future requirements when purchasing a 5224 Printer. Replaced parts from any model conversion become the property of IBM.

ACCESSORIES

- I **Forms Stand (#4450):** (NO LONGER AVAILABLE) A one-shelf, floor-standing forms stand provides for stacking of continuous forms after printing. For field installation, order by feature number on MES.
- I **Cables:** (NO LONGER AVAILABLE) IBM shielded twisted pair cable (or equivalent) or twinaxial cable is required for product attachment. Twinaxial cable is required for attachment to the 5340, 5251-2, or Series/1. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted pair cable - For proper identification, installation, and application of cable and associated accessories, refer to "IBM Cabling System - Planning and Installation Guide" (GA27-3361). For pricing and information refer to the Systems Supplies operation within your country.

Twinaxial cable - For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337). When cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Cabling - Order via part number. Allow a lead time of 120 days.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. Individual connectors P/N 7362229 are available for replacements.

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. This is an indoor/outdoor cable.

Twinaxial Cable Assembly (P/N 7362267): Includes a Connector Kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

- I **Twinaxial Station Protector Kit:** (NO LONGER AVAILABLE) The kit (B/M 7361807) includes two protectors. One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes. Order via bill of material number. Allow a lead time of 120 days. Customer Setup: Yes.

- I **S/1 Attachment Cables:** (NO LONGER AVAILABLE) For a description of cables and/or associated parts to attach the 5224 Printer to the S/1 (feature #5640), see "IBM Series/1 Customer Site Preparation Manual)" (GA34-0050). Twinaxial cabling for attachment to the 4952, 4954, 4955, 4959, or 4965 (feature #5640):

P/N 7362229, Device (5224) connector
P/N 6095524, 2x4 Berg Connector Kit
P/N 7362211, Twinaxial cable

SUPPLIES

Convenience Kit (#8014): (For 5224 with magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50 1,024-byte double-density diskettes, and five diskette magazines. Also included free of charge are the following items: Fittifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No.

Convenience Kit (#8016): (For 5224 without magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50 1,024-byte double-density diskettes. Also included free of charge are the following items: Fittifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No.

Ribbons: A black cartridge ribbon, P/N 6845100, or equivalent, is required. See your Country DP Supplies Coordinator.

Ribbon Shields: One ribbon shield is included with each quantity of five ribbons purchased from IBM. Ribbon shields are also available separately. For additional information, see your Country DP Supplies Coordinator.

5224 - PRINTER MODEL 12

PURPOSE

A table-top ideographic printer for S/34, S/36, and S/38. Traditional national character sets of Katakana, Kanji, and Chinese are available with the S/34. Katakana and Kanji are available with S/36 and S/38. Print speeds range up to 190 lines per minute (lpm) in alphameric mode and to 50 lpm in ideographic mode.

MODEL 12

Model 12 012: (NO LONGER AVAILABLE)

Customer Setup (CSU): The 5224 is a Customer Setup machine. Customer responsibilities are set forth in Information Bulletin for Customers - Customer Setup (G120-2743). CSU allowance is one day. CSU instructions are included with the 5224.

HIGHLIGHTS

The 5224 mdl 12 Printer is an impact matrix line printer of table-top design with characteristics and function similar to the 5225 mdls 11 and 12. A table is not provided with the printer. Two character sizes are offered. In alphameric mode at 10 characters per inch (cpi), the character matrix is eight dots high by seven dots wide. In ideographic mode at five cpi, the character matrix is 18 dots high by 18 dots wide. Alphameric and ideographic characters may be mixed on the same print line. The print mode is program selectable. Vertical spacing of four or six lines per inch (lpi) is program or operator selectable.

The 5224 mdl 12 can store 3,707 ideographic characters in Read Only Storage (ROS). In addition, 256 additional ideographic characters of the customer's selection can be stored in a program loadable buffer. This is in addition to the standard language group of Katakana or English. The number of characters in ROS, the buffer and the character sets have no effect on print speed.

A 33.5cm print line provides for 132 characters in alphameric mode or 66 characters in ideographic mode. An adjustable forms tractor facilitates feeding of continuous, margin punched forms. Forms with more than six parts should be tested for customer acceptance. See "Form Design Reference Guide for Printers" (GA24-3488) for forms design considerations. An audible alarm provides an indication to the operator when manual intervention is required due to an error condition. Cable-Thru provides the capability of connecting multiple printers in a multi-drop manner on a single twinaxial cable. A cartridge ribbon provides for fast, easy and clean ribbon changes. One cartridge ribbon and a ribbon shield, to prevent ink smudging, are provided with the 5224.

Throughput Considerations: The following factors determine print speed:

- Print position of the right-most character in the line being printed.
- Mix of lines containing alphameric and ideographic characters.
- Vertical spacing and skipping.
- Programming considerations.
- Density (quantity of dots) of each line printed.

Maximum throughput is achieved when printing lines up to 21.3cm long as measured from the left. Lines longer than 21.3cm will print at a rate reduced in proportion to the number of print positions utilized beyond 21.3cm. The following chart portrays these relationships to print speed:

Print Line Length			
Mode	CPS*	21.3cm	33.5cm

Alphameric (only)	440	190 lpm 84-char.	115 lpm 132-char.
Ideographic (only)	55	50 lpm 42-char.	30 lpm 66-char.

* Characters per second is in terms of a calculated instantaneous rate. Any printed line containing one or more ideographic characters will print at the rate of "Ideographic Mode only".

Care in forms design can significantly improve printer throughput. Unnecessary blanks between vertical columns should be avoided. Columns with low data content should be placed to the right of the form. Since print time may vary with each line printed, as line length varies, or due to spacing and skipping, typical customer documents should be benchmarked if specific throughput rates are desired. The 5224 Printer uses an internal print management feature to guard against damaging the printer due to the quantity of dots in a print line. When printing a dense line (a line with a large number of dots), this safeguard may cause the print mechanism to print the line by using multiple passes of the print head. When the printer operates in multi-pass mode, each print line requiring multiple passes is considered to be full length 33.5cm (13.2 inches). The nominal print speed in multi-pass mode for the mdl 1 is 20 lpm at 10 cpi and 15 lpm at 15 cpi. The mdl 2 in multi-pass mode operates at 25 lpm at 10 cpi and 20 lpm at 15 cpi. The additional time required for multi-pass printing lowers the overall throughput proportionally to the frequency of the dense lines printed.

Although some print lines may contain large quantities of dots (forcing multi-pass printing), usually only repetitive printing of the same character causes multi-pass printing. For example, a series of asterisks or dashes, normally used for highlighting are printed at a lower speed. In printing operations where speed is a primary concern, special techniques can be used to avoid multi-pass printing. For example:

Instead of using	Use
*****	* * * * *
#####	# # # # #
-----	- - - - -

Problem Determination Procedures: Problem determination is aided by significant off-line verification tests which have been designed into the printer control unit to provide greater printer availability to the customer. See "IBM 5224 Printer Operator's Guide" for procedures.

For Attachment to S/34: The 5224 Printer may be attached to S/34 as follows:

- When designated as the system printer, the 5224 connects to Workstation Control Expansion C (#4902) via one of the four twinaxial cable connectors on the 5340 System Unit. A 6m cable is provided with the 5340. Specify #9308 on the 5340.
- When designated as a local workstation printer, the 5224 attached in a manner similar to 5250 Information Display System devices via Workstation Control Expansion C (#4902) on the 5340. A maximum of 16 of these devices may be attached to S/34.

For Attachment to S/36: 5224 mdl 12 Printer may be attached to a S/36 having Workstation Controller Expansion feature.

For Direct Attachment to S/38: 5224 mdl 12 Printer may be attached to a S/38 having Workstation Controller Extended.

For cabling information, see "IBM Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide" (GA09-1622 for Japan, or GA09-1628 for Taiwan).

Programming Support: S/34, S/36, and S/38 Programming with Ideographic functions support 5224 mdl 12. Ideographic support Programs are:

- S/34:
 - System Support Program (ideographic version), 5726-SS1.
 - Ideographic Generator/Sort, 5726-IGI.
 - Utilities (ideographic version), 5726-UT1.
 - COBOL, 5726-CB1.
 - RPG II, 5726-RG1.
 - BASIC, 5726-BA1.
- S/36: (Japan only)
 - System Support Program, 5727-SS1.
 - Utilities, 5727-UT1.
 - COBOL, 5727-CB1.
 - RPG II, 5727-RG1.
 - BASIC, 5727-BA1.
- S/38:
 - Control Program Facility, 5714-SS1.
 - Interactive Data Base Utility, 5714-UT1.
 - COBOL, 5714-CB1.
 - RPG III, 5714-RG1.
 - BASIC, 5714-BA1.

Publications: The following manuals are included with the 5224 Printer when it is shipped to the customer. See "Documentation Group" under "Specify".

- GA34-0095 5224 Printer Operator's Guide
- GA34-0096 5224 Printer Customer Setup Guide
- 5224 Printer Unpacking Instructions
- 5224 Printer Packing Instructions

SPECIFY

- Voltage (AC, 1-phase): Specify one of the following:

50 Hz	60 Hz
100V #2804	100V #2730
200V #2806	120V #9911
220V #2813	200V #2732
240V #2801	208V #9902
	220V #2803
	240V #9914

- Color: Pearl White (no specify required).
- Language Group for Operator Panel: Specify #2922 for Japanese or #2939 for English.
- Documentation Group: For the language of the publications shipped with the machine, specify #0783 for Japanese or #0783 for English. If a publication has not been translated into Japanese, the English version will be provided.
- Attachment: Specify #9561 if the 5224 is the system printer; #9560 if it is a workstation printer.
- Character Set: Specify #2973 for Katakana, #2955 for Japanese, English, or #2956 for US English EBCDIC.
- Cables: See "Accessories". For cable specifications, see "IBM 5250 Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide" (GA09-1622 for Japan, or GA09-1628 for Taiwan).

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

- **Cables:** (NO LONGER AVAILABLE) Cables and/or associated parts to attach the 5224 Printer to the 5251 mdl 2 or 12, the 5340, the 5360, the 5362, the 5381, the 5285, or the 5288 may be purchased from IBM or from a customer-selected source. For the description of these cables and parts, see the "IBM 5250 Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide" GA09-1622, or GA09-1628 for Taiwan. The customer is responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5224.

Twinaxial Cabling - For attachment to 5251, 5255, and 5340. attachment cable. This is an indoor/outdoor cable.

Twinaxial Cable Assembly (P/N 7362267): Includes a Connector Kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230) - Permits two Twinaxial Cable Assemblies to be joined together. Order by part number. Allow a lead time of 120 days.

Twinaxial Station Protector Kit (B/M 7361807) - A kit includes two protectors. One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes. Customer Setup: Yes.

SUPPLIES

Convenience Kit (#8014): (For 5224 with magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50 1,024-byte double-density diskettes, and five diskette magazines. Also included free of charge are the following items: Fittifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No.

Convenience Kit (#8016): (For 5224 without magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50 1,024-byte double-density diskettes. Also included free of charge are the following items: Fittifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No.

Ribbons: A black cartridge ribbon, P/N 6845100 or equivalent, if required.

Ribbon Shields: One ribbon shield is included with each quantity of five ribbons purchased from IBM.

5225 PRINTER MODELS 1, 2, 3, 4

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

PURPOSE

An impact matrix line printer for the 5280 Distributed Data System, S/1, S/34, S/36, and S/38.

MODELS 1, 2, 3, 4

	Maximum Rated Speeds	
	10 Chars Per Inch	15 Chars Per Inch
Model 1 001 (NO LONGER AVAILABLE)	280 lpm	195 lpm
Model 2 002 (NO LONGER AVAILABLE)	400 lpm	290 lpm
Model 3 003 (NO LONGER AVAILABLE)	490 lpm	355 lpm
Model 4 004	560 lpm	420 lpm

See "Throughput Considerations" below for print speed factors.

Prerequisites: All 5225 Printers used in applications printing characters more dense than normal must have E/C 323150 factory installed or field B/M 6844756 installed. 5225 mdl 1 Printers printing OCR-A or bar-code must have E/C 987958 factory installed or field B/M 6840638 installed.

Customer Setup (CSU): The 5225 is a Customer Setup machine. The CSU allowance is one day. For additional information on CSU, see the GI section.

HIGHLIGHTS

An impact matrix printer utilizing refinements in technology to achieve line printer speeds. The character matrix is eight dots high and seven dots wide. Maximum character height is 2.92mm (0.115 inches). A variety of character sets are available. Character set size has no effect on print speed. Upper and lower case is provided in all character sets. See "Type Catalog" for character set arrays. Horizontal print density of 10 or 15 characters per inch (cpi) is operator-selectable. Line spacing of six or eight lines per inch (lpi) is also selectable. The 33.5cm (13.2 inch) print line provides for a maximum of 132 characters at 10 cpi and 198 characters at 15 cpi. Oversize and special characters, logos, business graphics, OCR-A, and bar-code printing can be printed dependent upon host programming support. See "Prerequisites" above. One ribbon and a ribbon shield, to prevent ink smudging, are provided with the 5225. A forms tractor provides for feeding margin punched continuous forms. See Form-Design Printers Reference Guide, GA24-3488, for forms design considerations. Forms skipping and vertical spacing are under program control.

Throughput Considerations: Five factors determine print speed:

1. The mdl of the 5225.
2. The print position of the right-most character in the line being printed.
3. The print density (10 cpi or 15 cpi).
4. Spacing and skipping.
5. Communications considerations.

Each mdl of the 5225 is designed to achieve maximum print speed for lines having up to a predetermined number of characters (design point). For each line exceeding the design point in length, print speed (lpm) will be reduced in proportion to the number of additional characters. Line lengths are determined by the print position

of the right-most character in the line being printed, not by the number of characters actually printed in the line. The following charts show the relationship of these variable factors in determining print speed.

10 Characters Per Inch Print Density

	mdl 1	mdl 2
Design Point (Characters)	74	98
Throughput for Lines up to the Design Point in Length (lpm)	280	400
Maximum Characters Per Line	132	132
Throughput for a 132-Character Print Line (lpm)	130	205

15 Characters Per Inch Print Density

	mdl 1	mdl 2
Design Point (Characters)	111	147
Throughput for Lines up to the Design Point in Length (lpm)	195	290
Maximum Characters Per Line	198	198
Throughput for a 198-Character Print Line (lpm)	90	145
Throughput for a 132-Character Print Line (lpm)	150	290

10 Characters Per Inch Print Density

	mdl 3	mdl 4
Design Point (Characters)	118	130
Throughput for Lines up to the Design Point in Length (lpm)	490	560
Maximum Characters Per Line	132	132
Throughput for a 132-Character Print Line (lpm)	330	520

15 Characters Per Inch Print Density

	mdl 3	mdl 4
Design Point (Characters)	177	195
Throughput for Lines up to the Design Point in Length (lpm)	355	420
Maximum Characters Per Line	198	198
Throughput for a 198-Character Print Line (lpm)	235	385
Throughput for a 132-Character Print Line (lpm)	355	420

Form design, which reduces the number of lines exceeding the design point, can optimize printer throughput. Since print time may vary with each line printed, typical customer documents should be benchmarked if specific throughput rates are required. Multiple

printer and display station operational loads may also affect performance.

Problem Determination Procedures: Problem determination is aided by significant offline verification tests which have been designed into the control unit to provide greater printer availability to the customer. See "IBM 5225 Printer Operator's Guide", GA34-0054, for procedures.

For Direct Attachment to S/34: The 5225 Printer may be attached to S/34 in the following manner:

- When designated as the system printer, the 5225 connects to the Workstation Controller via one of the four twinaxial cable connectors on the 5340 System Unit. A 6 meter (20 foot) cable is provided with the 5340. Specify #9307 on the 5340.
- When designated as a local workstation printer, the 5225 attaches in a manner similar to other 5250 Information Display System devices.
- Twinaxial cable is required for attachment to the 5340.

See "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for cabling information.

For Direct Attachment to S/36: The 5225 Printer may be attached to the S/36 in a manner similar to 5250 Information Display Station devices. See "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for cabling information.

For Direct Attachment to S/38: The 5225 printer may be attached to S/38 in the following manner:

- When designated as the system printer, the 5225 connects to the Workstation Controller feature on the 5381 via user-provided twinaxial or shielded twisted pair cable. Specify #9817 on the 5381.
- When designated as a local workstation printer, the 5225 attaches via the Workstation Controller feature on the 5381. Attachment is by user-provided twinaxial or shielded twisted pair cable in a manner similar to the 5219, 5224, and 5256 Printers.

See M5381 pages for Workstation Controller information. See "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for cabling information.

Remote Printing: For remote printing in a Communications Environment on S/34, S/36, and S/38, the 5225 mdls 1, 2, 3, or 4 may be attached to the 5251 mdl 2 or 12 with the Cluster feature (#2550) or the Dual Cluster feature (#2551) on the 5251. Twinaxial cable is required for attachment to the 5251-2. May also be attached to the 5294 workstation controller. See M5294 pages for workstation attachment limitations. See "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for cabling and configuration information.

S/1 Attachment: The 4952, 4954, 4955, 4956, 4959 Input/Output Expansion Unit, and the 4965 Diskette Drive and I/O Expansion Unit provide for the attachment of the 5225 via the Printer Attachment - 5200 Series (#5640). A 6 meter (20 foot) twinaxial Attachment Cable (#5780), is available. The printer may be attached up to a maximum distance of 1,525 meters (5,000 feet). See "Series/1 Customer Site Preparation Manual", GA34-0050, for cabling information. Twinaxial cable is required for attachment to the Series/1.

5280 Attachment: For attachment to the 5280 Distributed Data System, the 5285 Programmable Data Station and the 5288 Programmable Control Unit each provide for the attachment of the 5225 mdl 1, 2, 3, or 4 Printer, via twinaxial cable 1,525 meter (5,000 foot) maximum, to the appropriate printer attachment. See IBM 5280 Cable Assembly Manual, GA21-9341, for cabling information.

Customer Responsibilities: The marketing representative must advise customers of their responsibilities before receipt of the machine. For additional information, see the GI section.

The customer is responsible for:

1. Receipt, unpacking, and placement of the 5225.
2. Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions supplied with the 5225.
3. Notifying IBM of intent to relocate and for following IBM instructions for relocation of the 5225.
4. Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the IBM Branch Office.
5. Relocation of the 5225, if required, to allow IBM service access.
6. Using and following the problem determination procedures for the 5225 prior to calling IBM for service.
7. Installation and maintenance of signal cables and associated parts for attaching the 5225 to the 5251, 5285, 5288, 5340, or 5381.
8. When adding additional printers to the S/34, S/36, S/38 or 5280 Distributed Data System, the customer must modify the system configuration specifications.

See:

- SC21-7689 IBM System/34 Program Product Installation and Modification Reference Manual
- SA21-9444 System/36 - Preparing a Place for Your Computer
- SA21-9440 Planning for System Configuration
- SC21-9052 Changing Your System Configuration
- SA21-9475 System/36-5362 Planning a Place for Your Computer
- SA21-9483 Planning for System Configuration
- GC21-7775 IBM System/38 Guide to Program Product Installation and Device Configuration
- GC21-7824 IBM 5280 System Control Programming Reference Manual

Publications:

- GA21-9246 IBM 5250 Information Display System Introduction
- GA21-9337 IBM 5250 Information Display System Planning and Site Preparation Guide
- GA21-9351 IBM 5280 Planning and Site Preparation Guide
- GA21-9341 IBM 5280 Cable Assembly Manual
- GA34-0054 IBM 5225 Printer Operator's Guide

SPECIFY

- Voltage (AC, 1-phase): One must be specified.

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9891
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
220V #2803	
240V #9914	

- Power Cord and Plug: For a power cord with a standard plug, specify #2709. The plug available for each country is listed in the appropriate system planning and site preparation guide. If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a power cord without a plug.
- Color: One color accent must be specified. Specify #9060 for Willow Green, #9061 for Garnet Rose, #9062 for Sunrise Yellow, #9063 for Classic Blue, #9064 for Charcoal Brown, or #9065 for Pebble Gray. Printer background color is Pearl White.

● Language Group for Operator Panel:

Canadian Fr.	#2935	Italian	#2932
English	#2924	Japanese	#2930
French	#2928	Spanish	#2931
German	#2929		

● Character Sets: 95 characters except where noted. Specify one of the following:

Brazilian	#2975
Canadian French	#2977
EBCDIC	#2956
French	#2964
German	#2957
Italian	#2968
Japanese English	#2955
Japanese Katakana	
(129 characters)	#2973
Multinational	
(184 characters)	#9470
Portuguese	#2959
Spanish	#2960
Spanish Speaking	#2969

See "Type Catalog" for character set arrays. All workstations and printers attached to a S/34, S/36, S/38, and 5251 mdl 2 or 12 must have the same character set.

● Cables: See "Accessories" for cable ordering instructions. For cable specifications, see the "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, or "IBM 5280 Cable Assembly Manual", GA21-9341.

● System Attachment: Specify one of the following:

- S/1: #9566
- S/34: #9561 for system printer
#9560 for local wkstation printer
#9559 for remote wkstation printer
- S/36: #9567 for system printer
#9568 for local wkstation printer
#9569 for remote wkstation printer
- S/38: #9563 for system printer
#9564 for local wkstation printer
#9565 for remote wkstation printer
- 5280 System: #9562

SPECIAL FEATURES

Replaced parts from any special feature installation or removal remain the property of the customer.

Audible Alarm (#1470): Provides an indication to the operator when manual intervention is required due to one of nine printer error conditions or on command from the host. Maximum: One. Field Installation: Yes (between mdls 1, 2, 3, and 4 only).

Cable-Thru (#2680): Provides the capability of connecting multiple 5219s, 5224s, 5225s, 5251 mdl 1 or 11, 5252s, 5255s, and 5256s to a single cable. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and 5252 devices require twinaxial cable. Each unit on the cable, except the last, requires this feature. (Note: For relocation flexibility, the customer should have Cable-Thru on all workstations.) Maximum: One. Field Installation: Yes (between mdls 1, 2, 3, and 4 only).

MODEL CONVERSIONS

The upgrade purchase prices for model conversions may be greater than the purchase price differentials. Customers should carefully

evaluate their future requirements when purchasing a 5225 Printer. Replaced parts from any model conversions become the property of IBM.

ACCESSORIES

Cables: IBM shielded twisted pair cable (or equivalent) or twinaxial cable is required for product attachment. Twinaxial cable is required for attachment to the 5340, 5251-2, or Series/1. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

● Twisted pair cable - for proper identification, installation, and application of cable and associated accessories refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. For pricing and ordering information refer to the Systems Supplies operation within your country.

● Twinaxial cable - For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337. When cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Cabling (for attachment to the 5251 mdl 2 and 12, 5285, 5288, 5340, 5360, and 5362):

● Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Individual connectors, P/N 7362229, are available for replacements.)

● Twinaxial Wire (P/N 7362211): Order must specify the desired length.

Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (This is an indoor/outdoor cable.)

● Twinaxial Cable Assembly (P/N 7362267): Includes a Twinaxial Connector Kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

● Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

● Twinaxial Station Protector Kit (B/M 7361807): A kit includes two protectors. One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes. The station protector is a CSU accessory.

S/1 Attachment Cables: For a description of cables and/or parts to attach the 5225 printer to the S/1 (feature #5640) --- see "IBM Series/1 Customer Site Preparation Manual", GA34-0050. Twinaxial cabling for attachment to the 4952, 4954, 4955, 4959, or 4965 (feature #5640):

- P/N 7362229 Device (5225) connector
- P/N 6095524 2x4 Berg Connector Kit
- P/N 7362211 Twinaxial cable

SUPPLIES

Convenience Kit (#8018): (For 5224 with magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons. 50 1,024-byte double-density diskettes, and five diskette magazines. Also included free of charge are the following items: Fiftifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional

supply information, consult your Country DP Supplies Coordinator.
Field Installation: No.

Convenience Kit (#8020): (For 5224 without magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50 1,024-byte double-density diskettes. Also included free of charge are the following items: Fiftifile, proofreading ruler, printer spacing

pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No. Ribbons: A black ribbon, P/N 4412372 or equivalent, is required. For additional information, consult your Country DP Supplies Coordinator.

Ribbon Shields: One ribbon shield is included with each quantity of five ribbons purchased from your Country DP Supplies Coordinator.

5225 - PRINTER MODELS 11 AND 12

PURPOSE

An ideographic printer for S/34, S/36, and S/38. Traditional national character sets of Kanji for Japan and Taiwan Chinese are available with the S/34. Katakana and Kanji are available for Japan only on S/36 and S/38.

MODELS 11, 12

Maximum Speeds

	Alphameric Mode	Ideographic Mode
Mdl 11 011	300 lpm (880 cps)*	85 lpm (110 cps)*
(NO LONGER AVAILABLE)		
Mdl 12 012	475 lpm	140 lpm
(NO LONGER AVAILABLE)		

* cps is given in terms of a calculated instantaneous rate

See "Throughput Considerations" below for print speed factors.

Customer Setup (CSU): The 5225 is designated as a Customer Setup machine, thereby offering the customer early availability and relocation flexibility. The CSU allowance on the 5225 is one day. For additional information on CSU, see the GI section.

HIGHLIGHTS

A wire-matrix printer that utilizes multiple print wire groups to achieve line printer speeds. Two character sizes are provided: eight dots high by seven dots wide for alphameric and double wide characters 18 dots high by 18 dots wide for ideographic characters. Maximum character height for alphameric characters is 2.84mm (.112 inches) and for ideographic characters is 3.91mm (.154 inches). The 5225 mdls 11 and 12 internally store 3,707 characters. In addition, a buffer is provided to allow the system to load up to 256 different ideographic characters at a time from the extended set of ideographic or user-designed characters stored in the system. The number of characters in the character set has no effect on print speed.

Both mdls provide ideographic and alphameric multi-copy printouts. The fifth and sixth copies should be tested for customer acceptance. See "Form-Design Printers Reference Guide" (GA24-3488).

Print density of five cpi for ideographic characters or 10 cpi for alphameric characters is under program control. Vertical spacing of four lpi or six lpi is operator-selectable or host-selectable. The 33.5cm (13.2 inch) print line provides for a maximum of 132 alphameric characters or 66 ideographic characters. One ribbon and a ribbon shield, to prevent ink smudging, are provided with the 5225.

A forms tractor provides for feeding margin punched continuous forms. See "Form-Design Printers Reference Guide" (GA24-3488) for forms design considerations.

Throughput Considerations: The following factors determine print speed:

- The mdl of the 5225.
- The print position of the right-most character in the line being printed.
- The mix of lines containing one or more ideographic characters.
- Spacing and skipping.

Mdls 11 and 12 of the 5225 achieve maximum throughput when printing lines up to 31.5cm (12.4 inches) in length. This is the design point. For each line exceeding the design point in length, print speed (lpm) will be reduced in proportion to the additional length of each line. Line length is determined by measuring from the left-most (number one) printing position. The following chart shows the relationships of these variable factors in determining print speed:

Print Line Length

Mode	31.5cm (12.4 in.)	33.5cm (13.2 in.)
Mdl 11		
Alphameric Only	300 lpm	255 lpm
Ideographic Only	85 lpm	70 lpm
Mdl 12		
Alphameric Only	475 lpm	365 lpm
Ideographic Only	140 lpm	105 lpm

Any printed line containing one or more ideographic characters will print at the rate of "ideographic mode only".

Form design, which reduces the number of lines exceeding the design point, can optimize printer throughput. Since print time may vary with each line printed, typical customer documents should be benchmarked if specific throughput rates are required.

Problem Determination Procedures: Problem determination is aided by significant offline verification tests which have been designed into the printer control unit to provide greater printer availability to the customer. See "IBM 5225 Printer Operator's Guide" (GA34-0089) for procedures.

For Direct Attachment To S/34: The 5225 Printer may be attached to S/34 as follows:

- When designated as the system printer, the 5225 connects to the Workstation Control Expansion C (#4902) via one of the four twinaxial cable connectors on the 5340 System Unit. A 6 meter (20 foot) cable is provided with the 5340. Specify #9307 on the 5340.
- When designated as a local workstation printer, the 5225 attaches in a manner similar to other 5250 Information Display System devices.

For Attachment to S/36: (Japan only) 5225 mdl 11 and 12 Printers may be attached to a S/36 having the Workstation Controller Expansion feature.

For Direct Attachment to S/38: 5225 mdl 11 and 12 Printers may be attached to a S/38 having the Workstation Controller Extended.

See "IBM 5250 Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide" (GA09-1622 for Japan, or GA09-1628 for Taiwan) for cabling information.

Customer Responsibilities: The marketing representative must advise customers of their responsibilities before receipt of the machine. For additional information, see the GI section.

The customer is responsible for:

1. Receipt, unpacking, and placement of the 5225.
2. Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions supplied by IBM.
3. Notifying IBM of intent to relocate and for following IBM instructions for relocation of the 5225.

4. Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the branch office.
5. Relocation of the 5225, if required, to allow IBM service access.
6. Using and following the problem determination procedures for the 5225 prior to calling IBM for service.
7. Installation and maintenance of signal cables and associated parts for attaching the 5225 to the 5340, 5360, 5362, and 5381.

Publications:

- GA09-1621 - Japan, GA09-1625 - Taiwan: IBM 5250 Information Display System (Ideographic Language Implementation) Introduction
- GA09-1622 - Japan, GA09-1628 - Taiwan: IBM 5250 Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide

SPECIFY

- Voltage (AC, 1-phase): One must be specified.

50 Hz	60 Hz
100V #2804	100V #2730
200V #2806	120V #9891
220V #2813	200V #2732
240V #2801	208V #9902
220V #2803	
240V #9914	
- Power Cord and Plug: For a power cord with a standard plug, specify #2709. The plugs available are listed in the "IBM 5250 Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide" (GA09-1622 for Japan, or GA09-1628 for Taiwan). If the standard plug is not desired, specify #2710 for a power cord without a plug.
- Color: One color accent must be specified. Specify #9060 for Willow Green, #9061 for Garnet Rose, #9062 for Sunrise Yellow, #9063 for Classic Blue, #9064 for Charcoal Brown, or #9065 for Pebble Gray. Printer background color is Pearl White.
- Language Group for Operator Panel: Specify #2922 for Kanji. For Taiwan (English) (available for S/34 only), specify #2939.
- Character Sets: Specify one of the following:
 - #2955 for Japanese English
 - #2956 for EBCDIC
 - #2973 for Japanese Katakana
- Cables: See "Accessories" for cable ordering instructions. For cable specifications, see the "IBM 5250 Information Display System (Ideographic Language Implementation) Planning and Site Preparation Guide" (GA09-1622 for Japan, or GA09-1628 for Taiwan).
- System Attachment: Specify #9561 if the 5225 is the system printer or #9560 if the 5225 is a workstation printer.

SPECIAL FEATURES

Replaced parts from any special feature installation or removal remain the property of the customer.

- **Audible Alarm (#1470):** (NO LONGER AVAILABLE) Provides an indication to the operator when manual intervention is required due to one of nine printer error conditions. Maximum: One. Field Installation: Yes.

Cable-Thru (#2680): (NO LONGER AVAILABLE) Provides the capability of connecting multiple 5219s, 5225s, 5251 mdl 1 or 11, 5252s, 5255s, and 5256s to a single twinaxial cable. Each unit on the cable, except the last, requires this feature. Note: For relocation flexibility, the customer should have Cable-Thru on all workstations. Maximum: One. Field Installation: Yes.

MODEL CONVERSIONS

Change from model 11 to model 12 is field installable.

The upgrade purchase prices for a model change may be greater than the purchase price differential. Customers should carefully evaluate their future requirements when purchasing a 5225 Printer.

Replaced parts from any model change become the property of IBM.

ACCESSORIES

- **Cables:** (NO LONGER AVAILABLE) Cables and/or associated parts to attach the 5225 Printer to the 5251 mdl 2 or 12, 5285, 5288, 5340, 5360, 5362, or 5381 may be purchased from IBM or from a customer-selected source. For description of these cables and parts, see "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337) or "IBM 5280 Cable Assembly Manual" (GA21-9341). The customer is responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5225.

Twinaxial Cabling:

- **Twinaxial Connector Kit (P/N 7362268):** Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Individual connectors, P/N 7362229, are available for replacements.)
- **Twinaxial Wire (P/N 7362211):** Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (This is an indoor/outdoor cable.)
- **Twinaxial Cable Assembly (P/N 7362267):** Includes a Twinaxial Connector Kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.
- **Twinaxial Adapter (P/N 7362230):** Permits two Twinaxial Cable Assemblies to be joined together.
- **Twinaxial Station Protector Kit (B/M 7361807):** A kit includes two protectors. One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes. The station protector is a CSU accessory.

SUPPLIES

Convenience Kit (#8018): (For 5224 with magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50 1,024-byte double-density diskettes, and five diskette magazines. Also included free of charge are the following items: Fiftifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No.

Convenience Kit (#8020): (For 5224 without magazine feature) This S/36, S/38 Convenience Kit provides the basic start-up supplies plus application setup and programming tools at the same cost as the supplies sold separately. Each kit contains: Ten printer ribbons, 50

1,024-byte double-density diskettes. Also included free of charge are the following items: Fiftifile, proofreading ruler, printer spacing pad, forms ruler, flow chart template, and RPG debugging template. For pricing and additional supply information, consult your Country DP Supplies Coordinator. Field Installation: No.

Ribbons: A black ribbon, P/N 4412372 or equivalent, is required. Contact your Country DP Supplies Coordinator.

Ribbon Shields: One ribbon shield is included with each quantity of five ribbons purchased from IBM.

5229 PRINTER

PURPOSE

A bidirectional, wide-carriage, impact printer providing high quality printed output for the 5520 Administrative System. Print wheels in 10 pitch, 12 pitch, 15 pitch or proportional spacing are available to provide a selection of type style and graphic variations.

MODELS

Model B12

60 cps

Limitations:

1. Continuous forms:

Pin fed continuous forms can be used. See "Special Features" for Continuous Forms Feed Device and "Accessories" for Paper Table.

1- to 3-part continuous forms can be used on the full-width of the 5229 pin feed carriage. 4- or 5-part forms must be limited to a 14.5 inch pin-to-pin width.

Both edges of the pin fed forms must be fastened in the forms tractors.

No staples are permitted in the areas exposed to the interchangeable print wheel.

2. Printer operation and print quality vary with paper and number of copies. Multiple part forms should be tested in operating conditions to verify that results are satisfactory.

3. Single-sheet feed is by hand insertion, unless the optional Cut Sheet Feed Attachment (#3295) is used.

4. There is a limit on the number of permissible cable "junctions" on the twinaxial cable used to attach multiple 5219, 5229, 5258, Printers to the 5525 System Unit. See the 5520 Administrative Systems Installation Manual - Physical Planning (GA23-1011) for details. The manual also describes the limits on total number of printers attachable to the 5525, and multi-drop limits on a single line.

5. Paper Specifications:

Maximum paper width 483mm (19.0 inches)

Maximum pin-to-pin width on forms tractor is 445mm (17.5 inches)

Maximum print-line width 432mm (17.0 inches)

Maximum print depth 533mm (21.0 inches)

6. Cut Sheet Feed Attachment Paper Recommendations:

Suitable Paper:

All of the papers placed in the Cut Sheet Feed Attachment should be new, unused and without packaging damage. To ensure feed reliability all papers should be "riffled" or "fluffed" before being placed into the supply trays. The papers defined in this section are the only papers considered acceptable for use in the Cut Sheet Feed Attachment.

Type and Composition: Plain bond paper of one of the following compositions.

- No. 1 sulfite (100% chemical wood pulp)
- 25% cotton content
- 50% cotton content
- 100% cotton content
- Paper made from recycled office paper

Size: Using the Cut Sheet Feed Attachment, the following paper sizes can be fed lengthwise only unless otherwise noted.

- 178mm x 267mm (7.0 inches x 10.5 inches)
- 185mm x 267mm (7.25 inches x 10.5 inches)
- 191mm x 267mm (7.5 inches x 10.5 inches) *
- 203mm x 267mm (8.0 inches x 10.5 inches)
- 203mm x 330mm (8.0 inches x 13.0 inches) *
- 216mm x 279mm (8.5 inches x 11.0 inches)
- 216mm x 330mm (8.5 inches x 13.0 inches)
- 216mm x 356mm (8.5 inches x 14.0 inches)

* Can be fed lengthwise or sidewise.

Basis weights:

- 60 g/sq.m to 90 g/sq.m (16 pounds to 24 pounds).

- Optimum: 75 g/sq.m to 90 g/sq.m (20 pounds to 24 pounds bond) 25% or 50% cotton content.

Unsuitable Paper:

Following is a list of paper supplies that may be found in an office that *will not feed reliably* and may cause misfeeds and paper jams. This list is not intended to be all-inclusive.

- Coated paper.
- Vellum paper.
- Coated erasable bond paper
- Synthetic papers (rice paper, parchment, etc.).
- Translucent paper.
- Multi-sheet forms and documents (bound or unbound)
- Peel-off, pressure-sensitive labels.
- Some types of chemically-treated papers (such as paper used to make copies without carbon paper).
- Preprinted forms requiring a high degree of character placement accuracy.
- Dark colored paper.
- Envelopes.
- Card stock.
- Folded or creased documents.
- Paper with exposed gummed surfaces, holes, perforations, cutouts, or windows.
- Highly embossed paper (embossment height exceeding 0.508mm (0.02 inches). Note: Embossments should not be located within 15mm (0.59 inches) of any edge of the sheet.
- Preprinted papers containing chemicals or substances that leave a residue on the Cut Sheet Feed Attachment or printer components.
- A mix of different sizes and types of paper in a paper tray.
- Paper in unsatisfactory conditions: Paper with excessive curl or waviness exceeding 3mm (0.118 inches). Reams of paper with edges or corners folded or bonded together (fluffing may correct this condition). Paper with poorly cut (rough) edges.

Note: Paper should not be exposed to adverse temperature or humidity conditions (consult the paper manufacturer for recommended storage environment).

7. Paper and envelope capacities for automatic paper handling option: Each paper source drawer holds 200 sheets and the exit tray holds 400 sheets. Quantities are approximate and may vary depending on paper weight.

Prerequisites: In the 5525 System Unit, #4710, #4711, #4712 or #4715, and either #1105, #1700, #1701, #1702, or #1704 and licensed program 5611-SS2. See M5525 pages for details.

Customer Setup (CSU): The 5229 is designed as a Customer Setup device, thereby offering the customer early availability and relocation flexibility. The marketing representative must advise the customers of their responsibilities before receipt of the machine.

HIGHLIGHTS

- Has a rated burst print speed of up to 60 cps (assumes 96-character set with 10 pitch).
- Accommodates horizontal character spacing of 10 pitch, 12 pitch, 15 pitch or proportional spacing, according to the print wheel selected. Maximum 255-character line.
- Vertical spacing of 5-1/3, 6, or 8 lines-per-inch.
- Half-line spacing for superscripts and subscripts to a single level.
- First line registration, form skipping and spacing chosen by the user and then controlled by the licensed program.
- Single-speed carriage with skipping rate up to six inches-per-second.
- Noise level consistent with an office environment.
- Ribbon saver facility permits two modes of ribbon feed, to extend ribbon life where appropriate.
- Single-sheet feeding by hand, or the optional Cut Sheet Feed Attachment.
- Forms tractor for feeding continuous forms is optional.
- Multiple 96-character print wheel options available by type style and language graphic variations. See "Supplies" below.
- Optional Paper Table.
- Standard cable-thru capability to allow multiple printers on a single twinaxial cable up to an accumulative total distance of 1,524 cable-meters (5,000 cable-feet) radially from the 5525 System Unit.

5229 Printer (cont'd)

- Customer setup for early availability and relocation flexibility.

Problem Determination Procedures: Problem determination and recovery procedures are provided with the 5229 Printer when attached to the 5525 System Unit using licensed program 5611-SS2 to help provide increased availability of the printer, and other parts of the system, to the user. These procedures will be described in the HELPs and Messages facilities in the licensed program and in the following manuals: *IBM 5229 Printer Operators Guide* (GA23-1009), *IBM 5520 Administrative System Messages and Recovery Aids* (SC23-0748).

These procedures are designed to be easy to follow and use by the customer and it is the customers responsibility to follow them prior to calling for IBM service.

Customer Responsibility: The customer is responsible for:

- Receipt, unpacking, and placement of the 5229.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions provided by IBM.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5229.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the branch office.
- Relocation of the 5229, if required, to allow IBM service access.
- Installation and maintenance of signal cables and associated cable adapters for attaching the 5229 to the 5525 System Unit.
- When adding or moving 5229 Printers on the 5520 Administrative System, the customer may have to modify the system configuration specifications. See the *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1011).

Publications: *IBM 5520 Administrative System Introduction* (GC23-0702), and *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1011).

SPECIFY

- Voltage:

#0802 Low Voltage	(96.5V to 137V 50 Hz or 60 Hz)
#0801 High Voltage	(193V to 259V 50 Hz or 193V to 269V 60 Hz)

A power cord is shipped with the machine. The three digit country code in the machine order sheet will be used to select a power cord and plug with the specifications most commonly used in that country.
- Machine Nomenclature: Available at time of manufacture only. Specify one. This will select the language of the operator control panel and the customer setup procedures/operator's guide.

English #2927	German #2929
French #2928	Italian #2932
- Print Wheels: [Mdl B01, B02] One standard print wheel is shipped with the machine.

As of December 1, 1983, no specify required except as shown below:

All countries	Prestige Elite 12	
Canada must specify either:		
Canada/Bilingual	Prestige Elite 12	#2977
or		
Canada/English	Prestige Elite 12	#2978

Additional print wheels may be ordered as supplies by part number. See "Supplies" below.

- Cables: Customer-supplied. See "Accessories" and the *IBM 5520 Administrative Systems Installation Manual - Physical Planning* (GA23-1011) for ordering information. Specify #9050 if cable is ordered from IBM or #9055 if cable is ordered from another supplier.
- Data Rate: The data transfer rate is determined by the Local Device Control feature and the 5525 System Unit mdl. Specify #9300 for printers attaching through #4710 on the 5525 mdl 021, #9305 for Printers attaching through #4710 on the 5525 mdl 031 or

032, #9315 for Printers attaching through #4711 or #4712 on any mdl 5525.

SPECIAL FEATURES

Continuous Forms Feed Device (#3290): Provides a variable-width tractor for feeding continuous forms. **Field Installation:** Yes. **Customer Setup:** Yes.

Cut Sheet Feed Attachment (#3295): Provides cut sheet paper from two source trays under system control, paper transport, and output tray. **Field Installation:** Yes. **Customer Setup:** Yes.

MODEL CONVERSIONS (None)

ACCESSORIES

Paper Table (P/N 1308894): Provides paper support and a moveable guide for manual cut sheet insertion when no sheet or tractor feed is installed.

Paper Stacker/Tray (P/N 1494596): Permits feeding of continuous forms from a carton and provides for form stacking on a single shelf after printing.

Paper Trays (Top P/N 6819687, Bottom P/N 6819442): Provides additional trays for Cut Sheet Feed Attachment (#3295). Eliminates paper removal or installation from trays when customer uses a wide variety of papers.

Contact IBM for ordering details on above accessories.

Cables: IBM shielded twisted pair cable (or equivalent) or twinaxial cable is required for attachment of the 5229 to the system unit. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted pair cable - For proper identification, installation, and application of cable and associated accessories, refer to *IBM Cabling System - Planning and Installation Guide*, GA27-3361. For pricing and ordering information, refer to the Systems Supplies operation within your country.

Twinaxial cable - For proper identification, installation, and application of cable and associated accessories, refer to *IBM 5520 Administrative System Installation Manual - Physical Planning*, GA23-1011. When cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial wire and one connector kit are required for each attachment cable. Individual connectors P/N 7362229 are available for replacement.

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial wire and one connector kit are required for each attachment cable. Cable is an indoor/outdoor cable.

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

Order cables specifying part number. Allow lead time of 120 days.

Twinaxial Station Protector (P/N 6819750): One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Note: This Station Protector is different from those used with displays.

Order Station Protector specifying part number. Allow lead time of 120 days.

SUPPLIES

Ribbons: The IBM 463 ribbon (P/N 1299463) or equivalent. None required with machine order. Contact IBM for details.

Print Wheels: None required with machine order. Additional print wheels are available in a variety of print styles (see TC 5210 pages in "Type Catalog") and character sets and are interchangeable with the print wheel supplied with the machine. Contact IBM for Details. When ordering, consideration should be given to ordering a second print wheel for backup. Replacement and installation of the print wheel is a customer responsibility.

5231 CONTROLLER

PURPOSE

Control Unit for the 5230 Data Collection System for central collection of data from 5234 Time Entry Stations and 5235 and 5236 Data Entry Stations. Data is collected at the controller on either card or diskette media for subsequent transfer and processing on a data processing system.

MODELS

Mdl 1 001: Punches and interprets 96-column card output records from data entered through the Time Entry and Data Entry Stations. Punches and prints at 20 cards per minute. Also provides read capability for loading system definition records for system start-up. Characters punched and interpreted are the standard 64-character set corresponding to the 96-column card code. All other EBCDIC characters will be accepted by the system and converted to blanks. Card hopper and stacker capacity is 350 cards.

Mdl 2 002: Stores output records entered through the Time Entry and Data Entry Stations on diskette in 128-character records. An additional feature provides binary synchronous communication of data directly to a data processing system (unidirectional transmission only). See "Communications" for special attachment instructions to S/370 and 3741. The mdl 2 also provides read capability for loading system definition records for system start-up.

Mdl 3 003: Punches and interprets 80-column card output records from data entered through Time Entry and Data Entry Stations. The mdl 3 punches and prints at 21 cards per minute. Printed characters will be represented by the 64 character set EL. All other EBCDIC characters will be accepted by the system and converted to blanks. Card hopper and stacker capacity is 400 cards. The mdl 3 also provides read capability for loading system definition records for system start up.

Prerequisites: 5230 Data Collection System Accessory Package. See "Accessories" for details.

HIGHLIGHTS

- Non-programmable.
- Personalized through easy-to-use fill-in-the-blank forms.
- Application independent.
- Performs self-diagnosis during idle time.
- Choice of output media available.
- Operator guidance at entry stations.
- Optional communication capability via BSCA.
- Audible alarm sounds when operator attention is required.
- All controller mdls can be ordered with loop connection features which allow attachment of up to 15 entry stations in any combination.
- All models provide operator guidance to the user to assist them in responding to conditions requiring operator attention, e.g., output media full and almost full or a loop error.

See "Publications" for Guide form numbers.

Host Support for System/3 and System/32: See 5230 pages.

System Features: A non-programmable device utilizing read-only storage (ROS) for operational control with random access memory (RAM) for definitions uniquely specifying output record format and input requirements from entry stations. Definitions are personalized for customer application through up to six simple question and answer forms, key-entered into appropriate media for input into the controller at system start-up.

2-Wire Loop Attachment: Controls 2-wire loop for attachment of Time Entry Stations and Data Entry Stations to controller.

Unattended Operation: Once loaded with definition records the system will operate in an unattended mode (assuming no power or system failures) collecting data from entry devices. Status codes will be displayed and the internal alarm will sound whenever operator attention is required. In addition, the external alarm contacts will activate any external alarm provided by the customer. The alarm will also be activated when the output storage device is almost filled to capacity.

Input Media Validation: A check character can be defined for each card or badge entered at the entry stations. If the character does not match, the error will be indicated at the entry station and wait for the correctly coded badge or card to be entered into the station. It is recommended that the check character capability be used for card input to ensure proper orientation of the card when it is inserted into the Data Entry Station.

Self Diagnosis: Whenever there is idle time, the system will continue self diagnosis and display a status message if any problem is found. Alarm contacts will be activated and the internal alarm will sound if operator attention is required.

Controller Console: The console provides user communication with the controller to perform such functions as start/stop controller, set time of day, start/stop individual loops, respond to status messages, etc.

Console Lock: A keylock is provided to enable entry of data through the console. The key is removable in the "locked" or "disabled" position so no entry of data can be made via the console.

Alarm Contacts: Provides capability for the customer to add an external alarm to indicate a system status message has been displayed at the controller console requiring operator attention. Alarm contacts work in conjunction with the standard alarm. Customers may require both alarms, the standard audible alarm for the immediate vicinity and their own external (audible or visual) alarm for a remote location.

CE Diagnostic Port: The first loop can be used to attach up to three entry stations to the controller. The three remaining loops can support up to four entry stations each. The first loop is limited to three in order to accommodate a CE port in the controller to be used only by the CE (or other maintenance personnel for purchased systems) for entry station diagnosis, checkout, and repair of failing units.

Communications: The 5231 mdl 2 with the optional BSCA feature can communicate with appropriately configured System/3, System/32 (point-to-point only), System/34 (point-to-point only), 3741 mdls 2, 4 (point-to-point only), 5110 (point-to-point only), System/7, or S/370 mdls 115, 125, 135, 138, 145, 148, 15511, 158, 16511, 168, or 3031, 3032, 3033. Communications with S/370 mdls or 3031, 3032, 3033, is via ICA (where applicable), 2701, 2703, 3704 and 3705 operating under DOS/VS BTAM, OS/VS1 BTAM, or OS/VS2 BTAM. In particular, 2703 is not supported in 303X configurations. BSCA attachment is supported by CICS/VS operating under DOS/VS, OS/VS. Transmission to a 3741 is via communications link and must be reestablished for subsequent diskette transmission. Data communication on the mdl 2 controller is supported as a 3741 mdl 2 or 4. Transmission of data is one-way only, from the 5231 mdl 2 to a host. Communications is over multipoint (nonswitched) or point-to-point leased or switched facilities. Certain data communications characteristics such as full-speed or half-speed, security, and identification, are specified through the 5231 definition records and console messages. Refer to 5230 Data Collection System User Guide (GA34-0040) for complete description.

Customer Responsibilities: For details, see the 5230 Data Collection System User Guide (GA34-0040). The customer is responsible for the following

Prior to receipt of the 5230 Data Collection System:

- Sign the IBM Central Facility Maintenance Agreement Amendment (Z120-2476).

- Provide a Central Facility Maintenance location at the controller for entry station maintenance.
- Install and check out loop cables and station connectors.
- Supply proper power outlets to the controller and entry stations.
- Meet all applicable electrical, fire, safety, and other codes required in the area.
- Proper addressing of the station connectors.
- Install entry station mounting brackets.
- Connect the loop cable to the 5231 Controller loop connectors.

After receipt of the 5230 Data Collection System

- Connect the entry stations to the loop.
- Problem determination of failing Entry Stations, failing loops and the controller to a limited extent.
- Deliver the failing entry station to the Central Maintenance Facility site and return it to the floor location.
- Maintain loops.
- Security of customer data collected by the 5230.

If installing BSCA (#2704) on the 5231 Controller mdl 2, the following apply:

- Responsibilities related to the installation and maintenance of common carrier facilities/services as well as the IBM equipment. For further information, see M2700 and "Tele-processing Systems" pages.
- Obtain a firm installation date for the start of transmission services (including any required modems) prior to processing the order confirmation card. Refer to installation schedule section of the IBM 5230 Data Collection System User Guide (GA34-0040) for customer pre-installation responsibilities and recommended schedule.

IBM Modems: The following IBM modems can be attached to a 5231 mdl 2 Controller:

Modem	Speed (bps)
3863	2400
3868 mdl 1	2400
3872 mdl 1	2400/1200
3864	4800
3868 mdl 3/4	4800
3976 mdl 3	1200/600

Note: The 5231 Controller does not support Auto-Call Originate (#1091) on the 3872. Before ordering, check with PTT.

Environment: The 5230 Data Collection System is designed to operate in the following environment:

	5231*	5234
	5236	5235
		5239
Temp	10C to 40C (50F to 105F)	4C to 45C (40F to 113F)
Rel Hum	8 - 80%	8 - 80%
Max Wet Bulb	26.7C (80F)	26.7C (80F)

*The 5231 mdl 2 will operate up to 43C (110F)

The system is designed to operate in offices or factories. This assumes a building that is not air conditioned, but with normal winter heat and normal ventilation. For further environmental information, see the GI section, "Use of IBM Equipment in Industrial Environments". For questionable environments, contact Customer Engineering for assistance in determining the environmental suitability for the 5230 Data Collection System.

References: See M2700 pages for additional information concerning modems, communication facilities, machine attachment requirements, operating capabilities, and customer responsibilities.

Publications

- "5230 Data Collection System User Guide" (GA34-0040)
- "5230 Data Collection System Console Guide, Mdl 1" (GX34-0041)
- "5230 Data Collection System Console Guide, Mdl 2" (GX34-0042)
- "5230 Data Collection System Console Guide, Mdl 3" (GX34-0043)
- "5230 Data Collection System Data Communications Guide" (GC34-0044)
- "5230 Data Collection System Badge Specifications" (GA21-9259).

SPECIFY

- Power (AC, 1-phase): One must be specified.

50 Hz		60Hz	
100V	#2804	100V	#2730
110V	#2805	115V	#9901
123.5V	#2811	200V	#2732
200V	#2806	208V	#9902
220V	#2813	230V	#9904
235V	#2814		
- Power Cords: (Japan only> Specify #2747.<)(Except Japan> No special number needed.<)
- Machine Nomenclature:

English	#2927
French	#2928
German	#2929
Italian	#2932
Japanese	#2930
Spanish	#2931
- Print Option: (Mdls 1 and 3 only)

English US (EBCDIC 0)	#2950
French	#2970
German	#2957
Italian	#2968
Japanese	#2955
Spanish	#2960
- **Note:** For 60 Hz machines the only print options available are English US #2950 and Japanese #2955.
- Color:

#9060	Willow Green
#9061	Garnet Rose
#9062	Sunrise Yellow
#9063	Classic Blue
#9064	Charcoal Brown
- Processing system for the data collected by the 5231:

#9270	System/3 mdl 15
#9271	System/3 mdls except 15
#9273	System/7
#9272	System/32
#9279	System/34, Processing Sys
#9283	System/38
#9274	S/360
#9277	S/370, below mdl 145
#9278	S/370, mdls 145 - 168
#9281	S/370, 3031, 3032, 3033
#9280	5110
#9276	Non-IBM equipment
#9275	Other IBM equipment
- Cables: See "Accessories" for cable details.

SPECIAL FEATURES

Bi-Sync Comm. Adapter (BSCA) (#2074): This feature permits the 5231 Controller mdl 2 (only) to function on a switched or non-switched point-to-point line or multipoint nonswitched line as a 3741 mdl 2 or 4 terminal communicating in binary synchronous mode. The transmission is unidirectional from the 5231 mdl 2 to the host system. The 5231 mdl 2 will transmit to:

- A System/3 equipped with BSCA (#2074, #2084), LCA (#4765) or ICA (#4645 and #4802).
- A System/7 with TPMM (RPQ D08011) or TPMF (RPQ D08010).
- A System/32 with #2074 (point-to-point only).
- A System/34 with Communications Adapter#2704 (point-to-point only).
- A System/38 with appropriately configured BSC adapter and subfeatures (point-to-point only).
- A 3741 Data Station mdl 2 or 3741 Programmable Workstation mdl 4. Transmission to the 3741 is restricted to single diskette transfer (point-to-point only).
- A 5110 with BSCA (#2074). Transmission to the 5110 is restricted to single diskette transfer (point-to-point only).
- A S/370 mdl 115, 125, 135, 138, 145, 148, 155 II, 158, 165 II, 168 or 3031, 3032, 3033. Communications with a S/370 is via ICA (where applicable), 2701, 2703, 3704 or 3705 operating under DOS/VS BTAM, OS/VS1 BTAM, or OS/VS2 BTAM. In particular, 2703 is not supported in 303X configurations. BSCA attachment is supported by CICS/VS (operating under DOS/VS, OS/VS).

BSCA Optional Specifications (Mdl 2): When ordering, one selection must be specified from each of the first three categories below. Selection from category (4.) must be based on the notes following:

1. Transfer Rate:

600 bps	#9750
1200 bps	#9751
2000 bps	#9752
2400 bps	#9753
4800 bps	#9754
2. Network Attachment:

Point-to-Point (Nonswitched)	#9481
Multipoint Tributary	#9482
Point-to-Point (Switched-CDSTL)	#9475
Point-to-Point (Switched-DTR)	#9483
3. Planned Device Attachment:

System/3	#9580
System/7	#9590
System/32	#9591
System/34	#9594
System/38	#9599
S/370	#9570
S/370, 3031, 3032, 3033	#9596
3741 mdl 2, or 4	#9579
5110	#9595
Other IBM Equipment	#9592
Non-IBM Equipment	#9593
4. Line Facility Attachment:

* Duplex (4-wire only) **	#9391
Half-duplex (2-wire only) ***	#9392

* If Interface (#4780) is ordered with a 2-wire telephone connection or if a 1200 bps Integrated Modem (#5501) switched is ordered, no specify code is required.

** Specify #9391 only as follows: If Multipoint Tributary (#9482) is ordered, or If 1200 bps Integrated Modem (#5500) nonswitched is ordered, or If Interface (#4780) is ordered, and external modem attachment is to a 4-wire telephone line.

*** Specify #9392 only if Integrated Modem (#5500) is ordered based on 2-wire or 4-wire telephone line.

BSCA Feature Configuration: When the BSCA feature is ordered, either the Integrated Modem or External Modem Interface must be selected. Select either Item (1.) or (2.) and the required or optional special features.

Modem Interface	Internal Clock (#9334)
-----------------	------------------------

- | | |
|-------------------------------------|----------|
| 1. Interface (#4780) | Optional |
| 2. 1200 bps Integrated Modem: | |
| - Nonswitched (#5500) | Required |
| - Switched with Auto-Answer (#5501) | Required |

The BSCA feature is designed to operate at speeds between 600 and 4800 bps over PTT switched or nonswitched facilities or equivalent privately owned communication facilities. See M2700 pages for information on communications facilities. #2074 will operate in half-duplex mode over nonswitched communications lines which may be duplex or half-duplex facilities. Switched network versions include, as a basic capability, support of manual dial and manual or auto-answer operations (assumes the attached modems will support this mode of operation). Transmission code is EBCDIC. Limitations: For mdl 2 only. Maximum: One. Prerequisites: #5500, #5501, or #4780.

Secondary Output Punch Attachment (#3210): (Mdls 1 and 3 only.)

When ordered with the 5231 mdl 1 provides attachment of a 5496 Data Recorder equipped with System/3 mdl 6 or 5230 Attachment (#7501). When ordered with mdl 3 provides attachment of a 129 Card Data Recorder equipped with Card Input/Output Attachment (#7503). The attachment allows the 5496 Data Recorder or the 129 Card Data Recorder to be connected as a backup card punch/print for the 5231 Primary Punch. Limitations: For mdls 1 and 3 only. Maximum: One. Field Installation: Yes.

Loop 2 Attachment (#4700): Provides capability to attach four additional Data Entry or Time Entry Stations to the 5231 Controller. This expands total system capability to seven entry stations. Maximum: One. Field Installation: Yes. Prerequisites: 5230 Data Collection System Accessory Package (B/M 2461786).

Loop 3 Attachment (#4701): Provides capability to attach four additional data entry or time entry stations to the 5231 controller. This expands the total system capability to eleven entry stations. Maximum: One. Field Installation: Yes. Prerequisites: #4700 and 5230 Data Collection System Accessory Package (B/M 2461786).

Loop 4 Attachment (#4702): Provides capability to attach four additional Data Entry or Time Entry Stations to the 5231 controller. This expands the total system capability to its full capacity of fifteen entry stations. Maximum: One. Field Installation: Yes. Prerequisites: #4701 and 5230 Data Collection System Accessory Package (B/M 2461786). EIA/CCITT Interface (#4780)

Provides a cable and interface which meets CCITT V.24/V.28 characteristics for attachment of an IBM modem or PTT mandatory services. Non-IBM modems (other than specifically supported PTT mandatories) may be attached subject to Multiple Supplier Systems Policy. This feature also provides for local attachment to the receiving machine. Refer to appropriate machines pages for local attachment features required on receiving machines. For S/370 mdls 115 and 125 ICA local attachment refer to RPQs 7S0020 and 7S0021. Limitations: Cannot be installed with 1200 bps Integrated

Modem (#5500, #5501). For mdl 2 only. Maximum: One. Field Installation: Yes. Prerequisites: #2074.

Note: This feature may also require Internal Clock. Internal clock is available at 1200 bps with option to run at 600 bps. Selection of 600 bps operation is via 5231 console entry. Specify: If the internal clock is desired with the interface, specify #9334, or #9483 for attachment to switched lines. Specify #2835 for these modems which require answer-tone control, #9475 for Connect-Data-Set-to-Line operation, or #9483 for Data-Terminal-Ready operation if connected to switched lines.

1200 bps Integrated Modem (#5500, #5501): (Mdl 2 only.)

A modem for BSC data transmission at 1200 bps over nonswitched facilities or switched facilities. Available in two versions: #5500 for nonswitched and #5501 for switched. Attachment to the non-switched (2-wire or 4-wire) facilities is via an IBM-provided cable directly to the line facility DA3. Clocking speeds available are 600 and 1200 bps. Selection of speed is handled via console entry at the 5231. Attachment to the switched network is via an IBM-provided cable to a PTT line on facility CA2. The device communicating with the 5231 Controller must also be equipped with a 1200 bps Integrated Modem. Limitations: Cannot be installed with Interface (#4780). #5500 and #5501 cannot be installed together. For mdl 2 only. Maximum: One. Field Installation: Yes. Prerequisites: #2074. Specify: #9334 for Internal Clock, and #9475 or #9483 and #2835 if #5501 was selected. (Japan only > Specify #2943 for attachment of #5501 to NTT D-1 service.)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Cables: Except for loop cables (see below), no special order required for 5230 Data Collection System. Cables are shipped automatically with the type mdl and the associated features. A 9.1m (30 ft) modem cable will be furnished with the Control Unit. No cable order is required for 5231 mdl 2.

5230 Data Collection System Accessory Package: Contains the parts necessary for the customers to complete their pre-installation responsibilities. All items in the Accessory Package are prerequisites, except the Alarm Connector (B/M 2461785), to some machines of the 5230 System. The Contacts Closure Accessory is a prerequisite only for feature code #1480. The accessory items are ordered via the MES Order Guide (Z120-2665). Normal schedule ship date for the accessory package items or customer supplied equivalents should be scheduled to precede the 5230 system by a minimum of seven weeks. This is to allow the customers time to complete their preinstallation responsibilities prior to receiving the 5230 system. Items ordered are purchase only and no maintenance is available. Normal parts warranty of three months is applicable.

The Accessory Package provides the capability for the customer to order and install those physical installation accessories not readily available from the customer's normal supplier. See the 5230 Data Collection System User Guide (GA34-0040) chapter titled "Installation - Schedule of Events" for scheduled and pre-installation instructions.

Station Connector (B/M 2461780): Provides the interface between each Entry Station (5234, 5235 and 5236) and the loop cable. Addressing switches for entry station identification and a bypass relay are included as part of the connector. One station connector is required for each 5234, 5235 and 5236. It is recommended that at least one spare station connector should be ordered per 5230 system. The customer is responsible for supplying the receptacle housing for the station connector. Refer to IBM 5230 Data Collection System User Guide (GA34-0040) for details.

Mounting Bracket (B/M 2461781): Provides a metal bracket for either wall, pedestal or table mounting of a 5235 or a 5234. One mounting bracket is a prerequisite for each 5235 and 5234.

Loop Cable: Cable available from IBM to meet the loop requirements. Available in either a 152m (500 ft) spool (B/M 2461783) or 304m (1000 ft) spool (B/M 2461784). Loop cable B/M 2461783 or B/M 2461784 or equivalent must be used for system pre-installation. Specifications of this cable must be met if other cable is used.

Note: Specifications for the 5230 Data Collection System loop cable are available from IBM.

Alarm Connector (B/M 2461785): Provides a 3-pin connector to attach an external alarm to the 5231 Controller. The customer provides the external alarm and the wiring to the alarm connector (B/M 2461785). The customer provided wire must be stranded 20 AWG. Voltage and current on the wire must not exceed 48V and 1.5A respectively. The connector is plugged into the 5231 Controller at installation time. The customer supplied alarm is used, if desired, to provide an audible or visual signal to the customer when the 5231 Controller requires operator attention. This no-charge feature may be desirable even though the 5231 has an internal audible alarm as a standard feature.

Loop Connectors (B/M 2461786): Provides the connection between the 5231 Controller and the loop cable. One loop connector is a prerequisite for each 5231 Controller, and one for each additional loop (#4700, #4701, #4702) attached to the controller.

Contacts Closure Accessory (B/M 4413082): Is prerequisite for installing the Contacts Closure Feature (#1480) on the 5234 or 5235/5236. Contact Closure Accessory contains associated connectors, printed circuit card, and relay. It is recommended that at least one spare be ordered per 5230 System. More may be required if several features are installed per system. Customer must provide the external devices with required power and, if necessary, any circuitry to activate external devices that may require a longer time than the contact closure time of 0.5 seconds minimum. Contact maximum ratings are 28V AC/DC at 1.5A. The IBM-supplied crimp-on terminals for connecting external devices are designed for 18 to 22 AWG wire. Two sets of contacts are provided that can be used in a normally open or normally closed mode. The customer is responsible for supplying the receptacle housing for the Contact Closure Accessory. Refer to 5230 Data Collection System User Guide (GA34-0040) for details.

Berg Connector (B/M 8327397): Provides for the connection between the Series/1 and the loop cable. One Berg connector is required for each RPQ D02312, D02313, or D02314 attached to the Series/1.

SUPPLIES

The following items may be ordered for initial and replacement quantities as appropriate. The 5230 Data Collection System User Guide (GA34-0040) contains order forms for supplies. The User Guide instructs the customer to give the completed order form to the IBM marketing representative. It must be forwarded to the appropriate marketing representative.

Badges: See 5230 Data Collection System User Guide (GA34-0040) for standard format and other supplies data. For each badge order placed with NDD-SS, there is a minimum order quantity for each badge setup and a minimum total-quantity-per-customer order.

Cards

Mdl 1 -- 96-column (P/N 3700)

Mdl 3 -- 80-column (P/N 5081)

Manufacturing Applications Four cards commonly used in manufacturing related data collection applications can be ordered as standard supplies. Each type of card may be individually ordered.

Card Type

Order/Material Receipt
Material Issue
Move
Operation



M 5231.5
JUN 86

MACHINES

For format of these cards see the Data Collection Application Workbook (GH30-0203) from Mechanicsburg or (GE19-5096) from EPC.

Diskette: Mdl 2 (P/N 2305830) 128 byte.

Ink Roll Assembly: Mdl 3 (P/N 432695).

Ribbon: Mdl 1 (P/N 1136849). One supplied with the controller.

5247 DISK STORAGE UNIT

PURPOSE

Provides a high performance, sharable, fixed disk storage facility for the 5322 or 5324 Computer Processor Units.

MODELS

Model 11 011: 15.4Mb capacity.

Model 12 012: 30.8Mb capacity.

Prerequisites: Each 5322 or 5324 Computer which will utilize the 5247 Disk Storage Unit must have a 5247 Disk Unit Adapter (#3770) installed. The Computer attached to the standard 4 meter signal cable must have a diskette capability.

Standard Features: The standard 5247, Model 11 and 12, may attach one or two 5322 or 5324 Computers. If you wish more than two computers to be attached, see "Special Features" below.

HIGHLIGHTS

- Compact, self-powered, floor-standing unit designed to operate in normal office environments.
- Average access time of 40ms.
- May be shared by up to four 5322 or 5324 Computers -- three may be up to 300m (1,000 feet) distant. One computer must be adjacent to the 5247 for servicing use.
- High-speed serial data link attachment.
- Transparent data file sharing managed by micro-processor control logic.
- File format compatibility with System/23 diskettes provides application flexibility.

Logical Organization:

Block Size -- 512 bytes

Number of Blocks -- Mdl 11 - 30,123

Number of Blocks -- Mdl 12 - 60,247

The first 2,040 blocks of the disk are reserved for system use, diagnostics, and Customer Support Functions.

File Sharing: The presence of multiple users is managed in a way to retain maximum usability of the system and still maintain the integrity of shared data files. Specification of the degree of file sharing is under control of the application program. Applications written for a single System/23 Computer can be shared in a multiple computer configuration with no changes to the program. For more detailed information on the file sharing capabilities of the 5247, see "Using Your 5247 Disk" (SA34-0188). This publication is shipped with each 5247 Disk Unit Adapter (#3770) ordered for a 5322 or 5324 Computer.

Customer Setup (CSU): The 5247 is designated as customer setup. The marketing representative must advise the customer of their responsibilities before receipt of the machine. "5247 Customer Setup Instructions" (SA34-0187) are shipped with the machine.

CSU allowance is one day.

Physical Planning Information: Dimensions -- 660mm (26 in) H x 310mm (12 in) W x 493mm (20 in) D; Weight -- 47kg (105 lb); Maximum KVA -- 0.3; Heat Output -- 1,025 BTU/Hour. Service clearances required -- 610mm (24 in.) front and rear; 150mm (6 in.) on both sides.

SPECIFY

- Voltage (AC, 1-phase, 3-wire grounded): Standard power cord is 2.4m (8 ft).

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V* #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803
	240V #9914

* Only power option available in Canada.

- Power Plug: A molded cord set including the appropriate plug is supplied with each machine. For a power cord with a standard plug specify #2709 (for certain countries). See "Introducing System/23" (GA34-0106) for a graphic of the plug that will be furnished. If a standard plug is not desired for your customer, specify #2710 for a power cord without a plug. Specify #2710 is not available in Australia, Canada, or New Zealand.
- Signal Cables: One 4m (13 ft) cable is provided for first 5322 or 5324 to be attached. The first computer must be adjacent to the 5247 for servicing use. Additional signal cables must be ordered if more than one 5322 or 5324 Computer is to be attached to the 5247. See "Cable Assemblies" below.
- Machine Nomenclature: The following specify codes determine the language on the 5247 operator panel as well as the language of the publications and supporting machine readable information that are shipped with the product. If different language publications are required, they must be ordered separately.

Language	Specify Code
English	#2927
French	#2928 *
German	#2929
Italian	#2932
Spanish	#2931
Japanese	#2930

* French Canadian publications will be shipped for Canada (649).

SPECIAL FEATURES

Adapter Expansion (#3700): Provides the capability to attach a third and fourth 5322 or 5324 computer to the 5247. Prerequisites: Each 5322 or 5324 to be attached must have a 5247 Disk Unit Adapter (#3770) installed. Signal cables must be ordered for each 5322 or 5324 to be attached; see "Cable Assemblies" below. Limitations: One per 5247. Field Installation: Yes.

Cable Assemblies: One of the following cable assemblies is required for each 5322 or 5324 computer, after the first, to be attached to a 5247 Disk Storage Unit:

Feature	Cable Length
#3710	4m (13 ft)
#3715	15m (50 ft)
#3720	30m (100 ft)

#3725 150m (500 ft)
#3730 300m (1,000 ft)

The 5247 is designated as customer setup; therefore all cable installation and routing is the responsibility of the customer. See "5247 Customer Setup Instructions" (SA34-0187) for cable connection instructions and procedures. These cables are designed only for use inside a building or structure and are not to be used in an exterior environment.

MODEL CONVERSIONS

Model upgrades are permitted. All model upgrades and features are field installable by Customer Engineering.

The upgrade purchase price for model changes may be greater than the base machine purchase price differentials. Customers should carefully evaluate their requirements prior to purchasing a model that may require an upgrade.

Removed parts from any model upgrade become the property of IBM.

5251 DISPLAY STATION

PURPOSE

The 5251 is an advanced function display station for S/34, S/36, and S/38 for entering, editing, and displaying alphanumeric data. A movable keyboard permits the operator to display, enter, and manipulate data on the screen in a highly flexible and efficient manner.

MODELS 1, 2, 11, 12, 999

Model 1 001: (NO LONGER AVAILABLE) For special features, see below. Displays up to 960 characters with 12 lines of 80 characters each. Attaches to the 5251 mdls 2 or 12, 5340, 5381, or S/1. Used as the system console with S/34.

Model 2 002: (NO LONGER AVAILABLE) For special features, see below. Displays up to 960 characters with 12 lines of 80 characters each. Provides communication capability with S/34 and S/38 in SNA/SDLC mode. Optional features allow up to eight additional workstations.

Model 11 011: (NO LONGER AVAILABLE) Displays up to 1,920 characters with 24 lines of 80 characters each. Attaches to the 5251 mdls 2 or 12, 5294, 5340, S/36, 5381. Used as the system console with S/34, and S/36. See mdl 999.

Model 12 012: (NO LONGER AVAILABLE) Displays up to 1,920 characters with 24 lines of 80 characters each. Provides communication capability with S/34, S/36, and S/38 in SNA/SDLC mode. Optional features allow up to eight workstations to be attached.

Model 999 999: (NO LONGER AVAILABLE) Available for ease of order entry. Identical functions to mdl 11. Includes as standard the following:

- Feature #4600 - Typewriter-style keyboard
- Feature #2680 - Cable-Thru
- Default parameters will also be included (for certain countries) for voltage and language group. See "Specify".
- No other specify or features are available on the mdl 999.

Prerequisites: For mdls 1 and 11: A 5251 mdl 2 or 12 with Cluster feature (#2550) or Dual Cluster feature (#2551), a 5294, 5340, 5360, 5381.

For mdl 2: Transmission via PTT facility to a 5340 or 5381 with a communications adapter, requires a modem or a DDS Adapter. See "Special Features" for communications adapters.

For mdl 12: Transmission via PTT facility to a 5340, S/36, or 5381 with a communications adapter, requires a modem or a DDS Adapter. See "Special Features" for communications adapters.

Customer Setup (CSU): The 5251 is designated as a Customer Setup device, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, refer to the GI section. The IBM Marketing Representative must advise customers of their responsibilities before receipt of the machine. Special features are not CSU.

HIGHLIGHTS

- The standard character set includes 96 8 x 16 dot matrix characters including: 52 upper/lower case alphabetic, 10 numeric, and 34 special characters in addition to the space character (128-character Katakana). A 188-character Multinational Character Set (see "Special Features") is available, providing 112 alphabetic, 10 numeric, and 66 special displayable characters in addition to the space (does not include Katakana characters). See "Type Catalog" for character set and keyboard layout. Display functions in addition to normal intensity are high intensity, non-display, blink, underscore, column separator, and reverse image (dark characters on a light

background) on a field basis. The operator can also reverse the image of the entire screen. An audible alarm, under program control, is provided to alert the operator to special conditions. The keyboard with 24 application-assigned command functions provides input and control flexibility. See "Special Features".

- **Security Enhancements:** Data fields may be defined so data entered is accepted without being displayed on the screen. A Keylock (#4655) prevents operator usage of the display and keyboard when the key is in the locked position. The display is blanked and keyboard data entry is inhibited when the Keylock is locked. A Magnetic Stripe Reader (#4910) is available for entering user identification.
- **Field Editing:** Individual data input fields may be edited as Alphanumeric, Alpha Only, Signed Numeric, Field Exit Required, Right Adjust, Mandatory Entry, Mandatory Fill, Bypass, Auto Enter, Dup Enable, Monocase, and Self-Check Modulus 10 and 11 (Self-Check is optional on the 5251 mdls 2 and 12).
- **Cables:** Display stations are attached to other display stations or a controller with either twinaxial cable or IBM shielded twisted-pair cable (or equivalent). Twinaxial cable is required for attachment to the 5251-1, 5251-2, and the 5252. Maximum length of any one cable is 1,525m (5,000 ft). Up to seven workstations may be attached to a twinaxial cable via Cable-Thru (#2680). All cable-thru devices on a single cable must use the same cable type. Refer to "Accessories" section for ordering information.
- See "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for cabling information.
- **Clustering:** Additional workstations may be attached to the 5251 mdl 2 or 12 with the Cluster (#2550) or the Dual Cluster (#2551) feature. The Cluster feature allows attachment of up to four workstations and the Dual Cluster feature allows attachment of up to eight workstations. See "Special Features".
- **Communications:** The 5251 mdls 2 and 12 communicate with a S/34 or a S/38 equipped with compatible communications adapters operating in SDLC mode only. The 5251 mdl 12 can also communicate with S/36 equipped with a compatible communications adapter operating in SDLC mode. The mdls 2 and 12 communicate in half-duplex mode on nonswitched (leased) point-to-point and multipoint communication lines which may be duplex or half-duplex facilities (depending upon communication feature selected) at speeds up to 9600 bps, and on switched (dial) point-to-point communication lines at speeds up to 4800 bps. See M2700 pages for information on communications facilities. Limitations: A 1200 bps Integrated Modem (#5500, #5502), 2400 bps Integrated Modem (#5640, #5641), 4800 bps Integrated Modem (#5740, #5741), or Interface (#3701) is required. See "Specify" and "Special Features" for the required communication cable.

IBM Modems: One IBM modem may be attached to a 5251 mdl 2 or 12.

Modem	Speed (bps)	Facility
3863	2400	C3, D5
3872 mdl 1	2400/1200	C3, D5
3864	4800	D6
3865	9600	D8
(Except Canada>		
3976 mdl 3	1200/600	C2, D3<)

Prerequisites: CCITT Interface (#3701). Note: 5251 mdls 2 and 12 do not support Auto-Call Originate (#1091) on the 3872. For communications capabilities, product utilization, and special features, see M2700, 3863, 3864, 3865, and 3872 pages.

IBM Data Encryption Devices: A 3845 or 3846 Data Encryption Device may be attached between the 5251 mdl 2 or 12 and the external modem. Prerequisites: CCITT Interface (#3701). Note: Refer to M2700, 3845, and 3846 pages for information on 3845 or 3846 configuration and communications capability.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the "IBM 5251 Operator's Guide", GA21-9248. Also, see "Customer Responsibilities".

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5251.
- Physical setup, connection of cables to TP lines/modems and IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions supplied by IBM. Under certain conditions, when using integrated modems, an IBM CE may be required. Details of these conditions are described in the Customer Setup instructions.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5251.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packaging materials (if required) will be ordered by the branch office.
- Relocation of the 5251, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5251 prior to calling for IBM service.
- Providing a desk or tabletop to support the 5251.
- Installation and maintenance of signal cables between 5250 Information Display System components and the attached system.
- The installation and maintenance of PTT facilities/services. For further information, see M2700 pages and "Teleprocessing Systems" in the GI section.
- Obtaining a firm installation date for the start of transmission services (including any required modems). The IBM Marketing Representative must assure that a firm installation date is established prior to Order Confirmation.
- When adding additional display stations to S/34, S/36, or S/38, the customer may have to modify the system configuration specifications. See "IBM System/34 Program Product Installation and Modification Reference Manual", SC21-7689, "IBM System/36 Changing Your System Configuration", SC21-052, "IBM System/38 Guide to Program Product Installation and Device Configuration", GC21-7775.

Publications

- "IBM 5250 Information Display System Introduction Manual", GA21-9246.
- "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337.

SPECIFY

- Voltage (AC, 1-phase): For mdl 999, the following "default" power options will be supplied:

Argentina	#2813	220V 50 Hz
Australia	#2814	235V 50 Hz
Brazil	#9901	115V 60 Hz
Canada	#9901	115V 60 Hz
Colombia	#9901	115V 60 Hz
Japan	#2804	100V 50 Hz

Mexico	#9901	115V 60 Hz
Venezuela	#9901	115V 60 Hz

If exceptions to the above defaults are desired or if none are listed for your country, do not use mdl 999 for ordering from the following list. One must be specified.

50 Hz	60 Hz
100V #2804	100V #2730
100V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	220V #2803
220V #2813	
235V #2814	

- Color: Pearl White only (no specify required).
- Language Group: Includes nomenclature, keyboard graphics, and display screen graphics. See "Type Catalog" for keyboard nomenclature. For mdl 999, the following language group defaults will be supplied.

Argentina	Spanish Speaking	#2961
Australia	English US	#2956
Brazil	Brazilian	#2975
Canada	English US	#2956
Colombia	Spanish Speaking	#2961
Japan	Japanese Katakana	#2973
Mexico	Spanish Speaking	#2961
Venezuela	Spanish Speaking	#2961

If exceptions to the above defaults are desired or if none are listed for your country, do not use mdl 999 for ordering. For any mdl other than mdl 999, specify desired language group from the following:

Brazilian	#2975
Canadian French	#2977
English US (EBCDIC)	#2956
International	#2950
Japanese English	#2955
Japanese Katakana	#2973
Spanish Speaking	#2961

Note: The 5251 mdl 1 or 11 must specify the same language group as used on the 5251 mdl 2 or 12 to which it is attached.

- Keyboard: A keyboard must be selected (see "Special Features").
- Character Set: The 96-character EBCDIC character set is provided as standard. If the 188-character Multinational Character Set is desired, specify #2990. The Keyboards do not include the additional characters of the Multinational Character Set. All characters may be entered via a single or multiple key sequence. Multinational Control (#2990) is required on the 5340. Workstation Control Expansion (#4900) is required on the 5360. Workstation Expansion (#2905) is required on the 5362. All workstations attached to a S/34, a S/36, or to the same S/1 5250 Information Display System attachment must have the same character sets. Multiple attachments may be configured differently. The Multinational Character Set does not include Katakana characters.
- Cables: See "Accessories" for 5251 mdls 1 and 11 cable ordering instructions. For cable specifications, see the "5250 Information Display System Planning and Site Preparation Guide", GA21-9337.
- Power Cord: For mdl 999, the most commonly used plug for each country, as shown in the "IBM 5350 Information Display System Planning and Site Preparation Guide", GA21-9337, will be shipped with the machine. For all other mdls, specify the desired power cord as follows. For a power cord with a standard plug, specify #2709 (for certain countries). The plug available for each country is described in "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337. If a standard plug is not listed for your country or

is not desired for your customer, specify #2710 for a power cord without a plug.

- (Canada only) Power Plug: Specify #2715 for a locking plug, or #2709 for a nonlocking plug. <)
- Communication Cable (mdls 2 and 12 only): A 6m (20 ft) communication cable is provided as standard for attachment to an external modem, DDSA, or to a communication facility when an integrated modem is used. If a 12m (40 ft) cable is desired, specify #9461. (#9461 is not available with #5641 or #5741.)
- DDSA (#5650, #5651) Transmission Speed: #9822 for 2400 bps, #9823 for 4800 bps, or #9825 for 9600 bps.
- Default Order Entry: For certain countries a default order entry procedure is available. Mdl 999 may be ordered in lieu of a mdl 11 and will automatically include a nonlocking line cord plug (#9881), power supply, language group (based on the three digit country code), a typewriter-style Keyboard (#4600), and Cable-Thru (#2680). No other specify nor special features may be ordered for a mdl 999. If a different configuration is desired, it must be ordered as a mdl 11 with the desired specify and special features.

SPECIAL FEATURES

Cluster (#2550): Allows attachment of up to four workstations (5219, 5224, 5225 mdls 1, 2, and 3, 5251 mdls 1 or 11, 5252, 5256, 5291, or 5292). Provides four cable connections. The maximum allowable length of each cable is 1,525m (5,000 ft). To attach multiple workstations (up to four) to one cable, see Cable-Thru (#2680) for the 5225, 5251 mdls 1 and 11, 5252, and 5256. Limitations: Available for mdls 2 and 12 only. Cannot be installed with Dual Cluster (#2551). A 5252 represents two workstations. Maximum: One. Field Installation: Yes.

Dual Cluster (#2551): Allows attachment of up to eight workstations (5219s, 5224s, 5225s mdls 1, 2, and 3, 5251 mdls 1 or 11, 5252s, 5256s, 5291s, and 5292s). Two sets of four cable connectors are provided and up to four workstations may be attached to each set. The maximum allowable length of each cable is 1,525m (5,000 ft). To attach multiple workstations (up to four) to one cable, see Cable-Thru feature (#2680) for the 5225s mdls 1, 2, and 3, 5251 mdls 1 and 11, 5252s, and 5256s. Limitations: Available for mdls 2 and 12 only. Cannot be installed with Cluster feature (#2550). A 5252 represents two workstations. Maximum: One. Field Installation: Yes.

Cable-Thru (#2680): Provides the capability of connecting multiple 5219s, 5224s, 5225s, 5251 mdls 1 and 11, 5252s, and 5256s to a single cable. Each unit on the cable, except the last, requires this feature. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and 5252 devices require twinaxial cable. Notes: For relocation flexibility, the customer should have Cable-Thru on all workstations. #2680 will be supplied as standard on mdl 999. Limitations: Available for mdls 1, 11, and 999 only. Maximum: One. Field Installation: Yes.

Expanded Function (#3600): Provides four separate functions on a 5251 mdl 2 or 12. (See description below for functions provided and machines or systems supporting each function.)

Copy provides for the direct transfer and printing of a screen image from the 5251 mdl 2 or 12 or an attached 5251 mdl 1 or 11, 5252, 5291, or 5292 to a printer attached to the 5251 mdl 2 or 12. The selection and allocation of the printer is controlled by the system program. Not supported by S/34 or S/36.

Magnetic Stripe Reader Control provides control for Magnetic Stripe Readers feature (#4910) on the 5251 mdls 2 or 12 and on attached 5251 mdls 1 and 11 and 5252s.

Selector Light-Pen Control provides control for Selector Light-Pen feature (#6300) on the 5251 mdl 2 or 12 and on attached 5251 mdls 1 and 11. Not supported by S/34 or S/36.

Self-Check Number provides Modulus 10 and 11 checking to assure that all digits of a number have been correctly keyed from the 5251 mdl 2 or 12 keyboard or the attached 5251 mdl 1 or 11, 5252, 5291, or 5292 keyboards.

Limitations: Available for mdls 2 and 12 only. Maximum: One. Field Installation: Yes. CCITT Interface (#3701)

Provides an interface for attachment of an IBM modem or PTT Mandatory Service meeting CCITT V.24/V.28 characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. Limitations: Available for mdls 2 and 12 only. Cannot be installed with 1200 bps Integrated Modem (#5500, #5502), 2400 bps Integrated Modem (#5640, #5641), or 4800 bps Integrated Modem (#5740, #5741). Maximum: One. Field Installation: Yes. Prerequisites: Specify #9492 (Comm. Line Switch) when external modem has SNBU capability. Notes: #9492 is not required if external modem is a 3863, 3864, or 3865. Internal Clock (#4703) is also required when the external modem does not provide its own clocking. (Japan only) Specify: #2946 when attaching a non-IBM modem in Japan. This satisfies the NTT DTE self-test requirement. <)

Keyboard (#4600, #4601, #4602): One of the following must be selected:

#4600 - An 83-key keyboard with the EBCDIC character set, typewriter-like layout, movable, with 49 alphameric keys, 24 control keys, and 10-key numeric pad. Note: #4600 will be supplied as standard on mdl 999.

#4601 - A 66-key data entry style keyboard, movable, with 36 alphameric keys, 23 control keys, and seven blank keys.

#4602 - A 66-key data entry style keyboard with proof arrangement, movable, with 36 alphameric keys, 23 control keys, and seven blank keys. The numeric keys are arranged similarly to those of an adding machine.

Limitations: #4601 and #4602 are not supported when 5251 is directly or remotely attached to the 5340, or S/1, and are not available for mdl 999. Maximum: One of the above. Field Installation: Yes.

Keylock (#4655): Provides a lock and two keys, which prevents operator entry and display of data when in a locked position. Limitations: Not available for mdl 999. Maximum: One. Field Installation: Yes.

Internal Clock (#4703): Generates synchronizing and timing signals at 600 bps or 1200 bps when they are not provided by the modem. Selection by the operator of full or half-speed is switch-controlled. Contact IBM for determination of this feature's requirement with planned modems. Limitations: Available for mdls 2 and 12 only. Maximum: One. Field Installation: Yes. Prerequisites: #3701, #5500, or #5502.

Magnetic Stripe Reader (#4910): Provides the capability of reading numeric encoded information from a magnetic stripe on a wide range of credit cards, identification cards, and documents. The magnetic stripe may be encoded with up to 128 ABA numeric characters, including control characters. This feature enhances system data security by providing the ability to read an operator identification card without being displayed. See the IBM 5250 Functions Reference manual, SA21-9247, for specifications for magnetically striped and encoded identification cards. Limitations: Not available for mdl 999. Valid for numeric-only data and single data fields. Maximum: One. Field Installation: Yes. Prerequisites: #3600 on 5251 mdls 2 and 12; #4900 or #4901 (Far Eastern countries only) or #4902 <) on the 5340; #4900 on the 5360; or #2905 on the 5362 when displays are directly attached.

1200 bps Integrated Modem (#5500, #5502): A modem for operating at 600 bps or 1200 bps over a nonswitched or switched network. Line speed selection is under operator switch control. Available in two versions: #5500 - nonswitched, and #5502 - switched with manual answer. Attachment to the nonswitched (4-wire only) facilities is via an IBM-provided cable directly to the line, facility DA3. Attachment to the switched network is via an IBM-provided cable directly to the line, facility CA2. (Canada only) Attachment to the switched network is via an IBM-provided cable to a common carrier

arrangement type CDT or equivalent. <) The system communicating with the 5251 must also be equipped with a 1200 bps Integrated Modem. Limitations: Available for mdls 2 and 12 only. Cannot be installed with Interface (#3701), 2400 bps Integrated Modem (#5640, #5641), or 4800 bps Integrated Modem (#5740, #5741). Note: 5251s with a #5500 or #5502 cannot be field upgraded to a 2400 bps Integrated Modem (#5640, #5641) or a 4800 bps Integrated Modem (#5740, #5741). Maximum: One. Field Installation: Yes. Prerequisites: #4703. (Japan only) > Specify: #2943 for attachment #5500 to NTT D-1 service. <)

2400 bps Integrated Modem (#5640, #5641): A self-clocked integrated modem that operates in half-duplex mode at speeds of 2400/1200 bps. Speed selection is under host control. Equalization is automatic and continuously performed. Available in two versions: #5640 - nonswitched, operates over 4-wire nonswitched communication facilities in point-to-point or multipoint mode, and #5641 - switched, operates over 2-wire switched communication facilities. (Except Canada > #5641 conforms to CCITT recommendations V.26bis. Manual originate, manual answer and auto-answer procedures are used to establish connections. A World Trade Coupler, which permits direct attachment to the Public Switched Network when allowed by local PTT regulations, is included with this feature. <) (Canada only) > Attachment to the switched network is via an IBM-supplied cable to a common carrier arrangement type CBS or equivalent. <) The system communicating with the 5251 must also be equipped with a 3863 compatible 2400 bps Integrated Modem, a 3863 or a 3868 mdl 1 modem. Limitations: Available for mdls 2 and 12 only. Cannot be installed with CCITT Interface (#3701), 1200 bps Integrated Modem (#5500, #5502), DDS Adapter (#5650), or 4800 bps Integrated Modem (#5740, #5741). #5640 and #5641 cannot be installed together. Maximum: One. Field Installation: Not recommended. (Japan only) > Specify: #2943 for attachment of #5640 to NTT D-1 service. <)

Digital Data Service Adapter (#5650): An integrated adapter for point-to-point data transmission at speeds of 2400, 4800, or 9600 bps. The DDS Adapter may be used to locally connect a 5251 to a 5340 with DDS Adapter. This connection requires a special accessory DDS Adapter Connector with the 5340. No modem is required. Limitations: Not available for mdls 1 and 11. Cannot be installed with CCITT Interface (#3701), 1200 bps Integrated Modem (#5500, #5502), 2400 bps Integrated Modem (#5640, #5641), or 4800 bps Integrated Modem (#5740, #5741). Maximum: One. Field Installation: Not recommended.

4800 bps Integrated Modem (#5740, #5741): A self-clocked integrated modem that operates in half-duplex mode at speeds of 4800/2400 bps. Speed selection is under host control. Equalization is automatic and continuously performed. Available in two versions: #5740 - nonswitched, operates over 4-wire nonswitched communication facilities in point-to-point or multipoint mode -- #5741 - switched, operates over 2-wire switched communication facilities. #5741 conforms to CCITT recommendations V.27ter for 4800/2400 bps switched-line modems. Manual originate, manual answer, and auto-answer procedures are used to establish connections. (Except Canada > A World Trade Coupler, which permits direct attachment to the Public Switched Network when allowed by local PTT regulations, is included with this feature. <) (Canada only) > Attachment to the switched network is via an IBM-supplied cable to a common carrier arrangement type CBS or equivalent. <)

The system communicating with the 5251 must also be equipped with a 3864 compatible 4800 bps Integrated Modem, a 3864 or a 3868 mdl 2 Modem. Limitations: Available for mdls 2 and 12 only. Cannot be installed with Interface (#3701), 1200 bps Integrated Modem (#5500, #5502), 2400 bps Integrated Modem (#5640, #5641), or DDS Adapter (#5650, #5651). #5740 and #5741 cannot be installed together. Maximum: One. Field Installation: No. (Japan only) > Specify: #2943 for attachment of #5740 to NTT D-1 service. <)

Selector Light-Pen (#6300): A hand-held, pen-like device that permits the operator to select fields of data from the display screen for system input. Limitations: Not available for mdl 999. Not supported when the 5251 is directly or remotely attached to the 5340, S/36, or

directly attached to the S/1. Maximum: One. Field Installation: Not recommended. Prerequisites: #3600 on 5251 mdls 2 or 12.

MODEL CONVERSIONS

A mdl 999 may be changed to a mdl 11 in the field (see "Default Order Entry"). No other mdl changes are available.

ACCESSORIES

Keylock, Keys: The 5251 with Keylock (#4655) is shipped with two keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys to original purchaser.) Order additional keys on MES (your plant of manufacture). A letter of authorization with key identification number must accompany each order. Specify P/N 2546418. Allow six to eight weeks for delivery.

Display Screen Filter (#3225, #3226): #3225 for mdls 11 and 12, #3226 for mdls 1 and 2. A specially designed filter which attaches to the display screen, reducing reflected glare in those installations with adverse lighting conditions. Character contrast may also be enhanced. The filter is a CSU accessory. For 5251 mdls 11 and 12, B/M = 7361262. For 5251 mdls 1 and 2, B/M = 7361280.

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for direct product attachment. Twinaxial cable is required for attachment to the 5251 Mdls 2 or 12, 5294, S/34, S/36, S/38, or Series/1. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide", GA27-2787. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Individual connectors P/N 7362229 are available for replacement.)

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (This is an indoor/outdoor cable.)

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cables Assemblies to be joined together.

Twinaxial Station Protector Kit (B/M 7361807): Two protectors. One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes.

SUPPLIES (NONE)

5252 DUAL DISPLAY STATION

[NO LONGER AVAILABLE]

PURPOSE

The 5252 is an advanced function dual display station which attaches to the 5251 models 2 and 12, Series/1, 5340 System Unit or 5381 System Unit for entering, editing and displaying alphanumeric data. It may be used as the system console with System/34. The 5252 displays up to 960 characters on each display with 12 lines of 80 characters each. Two movable keyboards permit both operators to display, enter and manipulate data in a highly flexible and efficient manner.

MODELS

Model 1 001

Customer Setup (CSU): The 5252 is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, refer to the GI section. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine.

HIGHLIGHTS

The 5252 functions as two independent display stations. The standard character set includes ninety-six 8x16 dot matrix characters - 52 upper/lower case alphabetic, 10 numeric, 34 special characters in addition to "space". (Japan only - 128-character Katakana. +) A 188-character Multinational Character Set (see "Special Features") is available, providing 112 alphabetic, 10 numeric and 66 special displayable characters (Japan only+ does not include Katakana characters) in addition to "space". See "Type Catalog" for character set and keyboard layouts. Each display provides functional characteristics which permit normal intensity, high intensity, non-display, blinking, underscore column separator, and reverse image (dark characters on a light background) on a field basis. The image of each display can be reversed independently. Audible alarms, under program control, are provided to alert each operator to special conditions. The keyboards with 24 application-assigned command functions provide input and control flexibility. See "Special Features".

Security Enhancements: Data fields can be defined allowing entered data to be accepted without being displayed on the screen. A Keylock (#4655) prevents operator usage of both displays and both keyboards when the key is in the locked position. The displays are blanked and keyboard data entry is inhibited when the keylock is locked. Two Magnetic Stripe Readers (#4910) are available for entering user identification.

Field Editing: Individual data input fields can be edited as Alphanumeric, Alpha Only, Signed Numeric, Field Exit Required, Right Adjust, Mandatory Entry, Mandatory Fill, Bypass, Auto Enter, Dup Enable, Monocase and Self-Check Modulus 10 and 11.

Cabling: The cable attachments between the 5250 Display System components and/or systems must be made with twinaxial cable. Attachment using shielded twisted pair cable is not supported. Maximum length of any one twinaxial cable is 1,525 meters (5,000 feet). Up to seven workstations may be attached to a twinaxial cable via a Cable-Thru feature (#2680) on each workstation. A second workstation may be attached via the Cable-Thru feature (#2680). Twinaxial cable must be used between the first and second workstation and the maximum allowable distance between these two workstations is 30 meters (100 feet). See *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337) for cabling information.

Clustering: The 5252 may be attached to the 5251 mdl 2 or 12 with the Cluster (#2550) or the Dual Cluster (#2551) feature. The Cluster feature allows attachment of up to four workstations and the Dual Cluster feature allows attachment of up to eight workstations. The 5252 represents two workstations.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operators. The procedures are provided in the *IBM 5252 Operator's Guide* (GA21-9248). Also, see "Customer Responsibilities" below.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5252.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM.

- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5252.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packaging materials (if required) will be ordered by the branch office.
- Relocation of the 5252, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5252 prior to calling for IBM service.
- Providing a desk or table-top to support the 5252.
- Installation and maintenance of signal cables and associated parts for attaching the 5252 to the 5251 mdl 2 or 12, 5340, 5381 or Series/1.
- When adding additional display stations to Series/1, System/34 or System/38, the customer may have to modify the system configuration specifications. See *IBM System/34 Program Product Installation and Modification Reference Manual* (SC21-7689) or *IBM System/38 Guide to Program Product Installation and Device Configuration* (GC21-7775) or *IBM Series/1 5250 Information Display System Attachment Feature Initialization and Configuration Operator's Guide* (GA34-0098).

Publications: *IBM 5250 Information Display System Introduction Manual* (GA21-9246) and *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337).

SPECIFY

- Voltage (AC, 1-phase): One must be specified.

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	220V #2803
220V #2813	
235V #2814	

- Color: Pearl white only (no specify required).
- Language Group: Includes nomenclature, keyboard graphics and display screen graphics. See "Type Catalog" for keyboard nomenclatures. Select one of the following:

Brazilian #2975	Japanese English #2955
Canadian French #2977	Japanese Katakana #2973
English US (EBCDIC) #2956	Spanish Speaking #2961
International #2950	

Note: The 5252 must specify the same language group as used on the 5251 mdl 2 or 12 to which it is attached.

- Character Set: The 96-character EBCDIC character set is provided standard. If the 188-character Multinational Character Set is desired, specify #2990. The keyboards do not include the additional characters of the Multinational Character Set. All characters may be entered via a single or multiple key sequence. Multinational Control (#2990), is required on the 5340. All workstations attached to a System/34 must have the same character set. All workstations attached to the same Series/1 5250 Information Display System attachment must have the same character sets. However, multiple attachments may be configured differently. (Japan only - The Multinational Character Set does not include Katakana characters.)
- Power Cord: For a power cord with a standard plug, specify #2709 (for certain countries). The plug available for each country is described in *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337). If a standard plug is not listed for your country or is not desired for your customer, a power cord without a plug is available, specify #2710.
- System Attachment: Specify the unit that the 5252 is attached to: #9559 for 5251 mdl 2, #9560 for 5251 mdl 12, #9561 for 5340, #9562, for 5381, or #9563 for Series/1.
- Keyboards: Two must be selected. See "Special Features".
- Cables: See "Accessories". For cable specifications, see the *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337). Specify #9050 if cable is ordered from IBM, #9055 if cable is ordered from another source, #9060 if 5252 is to

5252 Dual Display Station (cont'd)

be used with System/34 as the system console (no cable order required), #9065 if existing cable will be used (no cable order required).

SPECIAL FEATURES

Cable-Thru (#2680): Provides the capability of connecting multiple 5225s, 5224s, 5219s, 5252s, 5251 mdls 1 and 11, and 5256s to a single twinaxial cable. Each unit on the cable, except the last, requires this feature. Note: For relocation flexibility, the customer should have Cable-Thru on all workstations. **Maximum:** One. **Field Installation:** Yes.

Keyboard (#4600, #4601, #4602): Two of the following must be selected:

#4600: 83-key keyboard with the EBCDIC character set, typewriter-like layout, movable, with 49 alphameric keys, 24 control keys and 10-Key numeric pad.

#4601: 66-key data entry style keyboard, movable with 36 alphameric keys, 23 control keys and seven blank keys.

#4602: 66-key data entry style keyboard with proof arrangement, movable, with 36 alphameric keys, 23 control keys and seven blank keys. The numeric keys are arranged similar to those of an adding machine.

Limitations: #4601 and #4602 are not supported when the 5252 is directly attached to the 5340 or Series/1. **Maximum:** Two of the above. **Field Installation:** Yes.

Keylock (#4655): Provides a lock and two keys which prevents operator entry and display of data on either workstation when in a locked position. **Maximum:** One. **Field Installation:** Yes.

Magnetic Stripe Reader (#4910): Provides the capability of reading numerically encoded information from a magnetic stripe on a wide range of credit cards, identification cards and documents. The magnetic stripe may be encoded with up to 128 numeric characters, including control characters. This feature may be used to enhance system data security by providing the ability to read an operator identification card without being displayed. Contact IBM for magnetically striped and encoded identification cards. **Limitations:** Valid for numeric-only data and single data field. **Maximum:** Two. **Field Installation:** Yes. **Prerequisites:** #3600 on 5251 mdls 2 or 12, or #4900 on 5340 when 5252 is directly attached.

MODEL CONVERSIONS (None)**ACCESSORIES**

Keylock and Keys: The 5252 with Keylock #4655 is shipped with two keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys to original purchaser). A letter of authorization with key identification number must accompany each order. Specify P/N 2546418. Allow six to eight weeks for delivery.

Cables: Twinaxial cables and/or associated parts to attach the 5252 to other components or systems of the 5250 Information Display System, may be purchased from IBM or from a customer-selected source. For the proper identification, installation, and application of the subject cables and parts refer to *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337) or *IBM 5280 Cable Assembly Manual* (GH21-9341). The customer is responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinax " Adapter (P/N 7362230): For connecting two cable assemblies.

Twinax Cable Assembly (P/N 7363367): Cable with two connectors attached to bulk wire. The required length must be specified on the order.

Twinax Connector Kit (P/N 7362268): Two loose connectors. Individual connectors (P/N 7362229) are available for replacement. One Twinax Connector Kit and Twinax Wire are required for each attachment cable.

Twinax Wire (P/N 7362211): Bulk wire. Length must be specified. This is an indoor/outdoor cable.

Twinax Station Protector Kit (P/N 7361807): A kit Includes two protectors. One is required at each end of each Twinax attachment cable installed outdoors (either above or below ground level). Individual Twinax station protectors (P/N 7362426) are available for replacement purposes.

SUPPLIES (None)

MACHINES
5253 DISPLAY STATION
PURPOSE

The 5253 Display Station is an advanced function display station for the 5520 Administrative System which provides for entering, editing, and displaying word processing information. The 5253 displays up to 1,920 characters with 24 lines of 80 characters each. Dual text and attribute buffers allow vertical scrolling and horizontal segmenting of stored pages. See M5525 pages for limitations on operation when attached to the 5525 System Unit, supported by the 5520 Administrative Processing Program. A movable keyboard permits the operator to display, enter, and manipulate information on the screen in a highly flexible and efficient manner.

MODELS
Model 1 001

Customer Setup (CSU): The 5253 is designated as a Customer Setup device, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, refer to the GI section. The marketing representative must advise customers of their responsibilities before receipt of the machine.

HIGHLIGHTS

The displayable character set includes 187 8 x 16 dot matrix characters. See "Type Catalog" for character set and keyboard layouts. Display functions include: non-display, blinking, underscore, and reverse image (dark characters on a light background). Each of the above highlights may occur on a character, word, or line basis. In addition, individual character positions may be superimposed with a slash, dash, or double underscore. See M5525 pages for limitations on operation when attached to the 5525 System Unit, supported by the 5520 Administrative Processing Program.

Contextual cursor control is provided by four outboard keys on the keyboard. The cursor is positioned forward or backward on a character, word, line, page, etc., by the depression of a single key when using the contextual cursor. An additional ten outboard keys provide special function control.

Security Enhancements: Character positions may be defined so that entered data is accepted without being displayed on the screen. A Keylock (#4655) helps prevent operator usage of the display and keyboard when the key is in the locked position. The display is blanked and keyboard text entry is inhibited when the keylock is locked.

Attachment to the 5520 Administrative System: Twinaxial type cable connectors are provided on the 5525 System Unit for attachment of the 5253 Display Stations (and the 5254 Dual Display Stations). The cumulative maximum length of any one cable is 1,524 meters (5,000 feet). Up to seven display stations can be attached to any one cable via the Cable-Thru feature (#2680). The 5254 represents two display stations. See *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1011) for additional cabling information.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided with each 5253. Also see "Customer Responsibilities" below.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking, and placement of the 5253.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting, and checkout in accordance with instructions provided by IBM.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5253.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the branch office.
- Relocation of the 5253, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5253 prior to calling for IBM service.
- Providing a desk or table-top to support the 5253.
- Installation and maintenance of signal cables and associated parts for attaching the 5253 to the 5525 System Unit.
- When adding additional display stations on the 5520 Administrative System, the customer may have to modify the system configuration specifications; refer to the *IBM 5520 Administrative*

System Installation Manual - Physical Planning (GA23-1002 or GA23-1011).

Publications: Refer to M5525 pages for the available publications.

SPECIFY

- Voltage (AC, 1-phase): Select one of the following:

50 Hz	60 Hz
100V #2804	115V #9901
110V #2805	
123.5V #2811	
200V #2806	
220V #2813	
235V #2814	
- Color: Pearl White only (no specify required).
- Power Cord and Plug: Standard power cord is 2.4 meters (8 feet). For a power cord with a standard plug, specify #2709 (for certain countries). The plug available for each country is described in *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337). If a standard plug is not listed for your country, or is not desired for your customer, specify #2710 for a power cord without a plug. (Canada only) Specify #2715 for a locking plug, if required. (+)
- Operator Console: Language code for the console panel (operator guidance). One must be selected.

Canadian Bilingual	#2935
English US	#2924
- Cover: No specify required.
- Keyboard: A keyboard must be selected (see "Special Features").
- Cables: See "Accessories" for 5253 cable ordering instructions. For cable specifications, see the *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1002 or GA23-1011). Specify #9050 if cable is ordered from IBM or #9055 if cable is ordered from another source.

SPECIAL FEATURES

Cable-Thru (#2680): Provides the capability of connecting multiple 5253s and 5254s to a single cable. Each unit on the cable, except the last, requires this feature. Note: For relocation flexibility, the customer should consider including #2680 on all display stations. **Maximum:** One. **Field Installation:** Yes.

Function Extension Feature (#3270): This feature is a prerequisite for the 5520 Administrative System 3270 Emulation Capability. See M5525 pages for limitations on operation when attached to the 5525 System Unit, supported by the 5520 Administrative Processing Program. Refer to 5520 in "Programming" and M5525 pages for additional information. **Maximum:** One. **Field Installation:** Yes.

Keyboard (#4611): One of the following keyboard combinations must be selected. Use #4611 plus appropriate country keyboard specify code, which is required for all keyboards other than Keyboard ID 001 (U.S./Australia).

Operator Language	Keyboard ID	Specify Code
Canadian Bilingual	039 (Canada)	#2978
Canadian French	039 (Canada)	#2977
English US	001 (U.S./Australia) *	(None)

* U.S./Australia keyboard available in Pebble Gray color only.

All keyboards are 96-character text keyboards with a typewriter-like layout, movable, with 48 alphameric keys and 36 control keys. **Maximum:** One. **Field Installation:** Yes.

Keylock (#4655): Provides a lock and two keys which helps prevent operator entry and display of data when in a locked position. **Maximum:** One. **Field Installation:** Yes.

Symbol Display (EC #835667): Standard on all 5253s shipped from the plant after February, 1984. Without this EC symbols emanating from keyboard #202 and #204 are displayed on the screen as equivalent non-symbol characters, video-reversed. With this EC all symbols are displayed as fully-formed graphics. See 5520 programming for further details. **Maximum:** One. **Field Installation:** No.

MODEL CONVERSIONS (None)

5253 Display Station (cont'd)

ACCESSORIES

Keylock Keys: The 5253 with Keylock (#4655) is shipped with two keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys to original purchaser of the keys only.) Key Identification Number must accompany each order. Specify P/N 2546418. Allow six to eight weeks for delivery.

Display Screen Filter (#3225): A specially designed filter which attaches to the display screen reducing reflected glare in those installations with adverse lighting conditions. Character contrast may also be enhanced. The filter is a Customer Setup accessory. For shipment with the 5253, order by feature number. For shipment to the field, order by bill of material number. Specify B/M 7361433.

Palm Rest (#7796): This accessory attaches to the keyboard. It provides an extension of the top surface of the keyboard, which allows operators to rest the palms of their hands while typing. The Palm Rest, available in those countries supported by Vimercate manufacturing, is a purchase-only accessory for plant or field installation. In countries where the Palm Rest is a mandatory requirement, the marketing representative should ensure that the order for the Palm Rest accompanies the order for the display and keyboard. Customers ordering a Palm Rest for field installation must be advised that it is a customer-installed option only. Attachment of the Palm Rest is made with two metric socket flat-head screws (provided). A metric socket key, shipped with the Palm Rest MES, is used to tighten the screws. No customer-provided tools are required.

Cables: The cables and/or associated parts to attach the 5253 to the 5525 may be purchased from IBM or from a customer-selected source. For the description of these cables and parts, see the *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1002 or GA23-1011). The customer is responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5253.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one connector kit are required for each attachment cable. (Individual connectors, P/N 7362229, are available for replacement.)

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one connector kit are required for each attachment cable. (This is an indoor/outdoor cable.)

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector (P/N 7362426): One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Note: This station protector is different from that used for printers or a System Unit attached via a printer line.

SUPPLIES (None)

5256 PRINTER

PURPOSE

- The 5256 provides printed output for the 5280, S/34, S/36, and S/38. It is a bidirectional impact matrix printer with dual 256 byte buffers and full buffer formatting capabilities.

MODELS 1, 2, 3

Model 1 001: 40 cps maximum

Model 2 002: 80 cps maximum

Model 3 003: 120 cps maximum

Customer Setup (CSU): The 5256 is designated as Customer Setup, thereby offering the customer early availability and relocation flexibility. Customer responsibilities are set forth in Information Bulletin for Customers - Customer Setup (G120-2743). CSU instructions are included with the 5256.

CSU allowance is as follows:

5280 System (with initial system installation) - 2 days
5280 System (subsequent installation) - 1 day

S/34 (initial and subsequent installation) - 1 day
S/36 (initial and subsequent installation) - 1 day
S/38 (initial and subsequent installation) - 1 day

The marketing representative must advise customers of their responsibilities before receipt of the machine.

- When adding additional printers to the 5280, S/34, S/36, or S/38, the customer may have to modify the system configuration specifications. See "IBM 5280 System Control Programming Reference Manual, (GC21-7824), "IBM System/34 Program Product Installation and Modification Reference Manual, (SC21-7689), "IBM System/36 - Changing Your System Configuration", (SC21-9052), or "IBM System/38 Guide to Program Product Installation and Device Configuration", (GC21-7775).

HIGHLIGHTS

Maximum printer throughput is obtained with bidirectional serial matrix printing and indexing without unnecessary print head movement. Matrix characters are formed by eight vertical wires printing dots in up to four of seven possible horizontal positions, giving high legibility with character spacing at 10 characters to the inch for the standard upper/lower case 95-character set (Japan only) > 129-character Katakana < > A 184-character Multinational Character Set is available (Japan only) > (does not include Katakana characters). < > See "Specify" below. The maximum print line is 132 print positions.

The operator can select six or eight lines per inch (lpi) vertical spacing. Overlapped printing may result when printing at eight lpi. A variable width forms tractor provides for feeding continuous forms. Single cut forms may be processed in typewriter fashion. For optimum handling of continuous forms, a Forms Stand (#4450) is recommended. See "Accessories". Refer to "Form-Design Printers Reference Guide", (GA24-3488), for forms design considerations and limitations. See "Type Catalog" for character set arrays.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the "IBM 5256 Operator's Guide", (GA21-9260).

For Direct Attachment to the 5280: The 5280 Distributed Data System provides cable connectors for attachment of the 5256 Printer to the 5285 Programmable Data Station and to the 5288 Programmable Control Unit. The 5285 Programmable Data Station will allow local attachment of the 5256 Printer to the Twinaxial Printer Attachment (#1150). The 5288 Programmable Control Unit will allow local attachment of the 5256 Printer to the Single Twinaxial Printer Attachment (#1155), the Multiple Twinaxial Printer Attachment (#1160), or the Multiple start/Stop-Twinaxial Printer Attachment (#1162). If multiple printers are attached to one port (see M5285, 5288 pages), each printer except the last requires Cable-Thru (#2680) on the 5256. All connections use twinaxial cable only. The maximum length of the cable is 1,525 meters (5,000 feet). See IBM 5280 Cable Assembly Manual (GA21-9341) for cabling information. See the M5288 pages for description of these special features.

For Direct Attachment to S/34: The 5340 System Unit provides four cable connectors for attachment of the 5219, 5224, 5225, 5251 mdl 1 and 11, 5252, 5256, 5291, and 5292. One cable connector is dedicated to the exclusive attachment of a display station utilized as the system console. No other devices may be attached to this cable. The three additional cable connectors on the 5340 are provided for attachment of additional workstations (5219, 5224, 5225, 5251 mdl 1 or 11, 5252, 5256, 5291, or 5292). Up to eight workstations, including the system console, may be attached to the 5340 without special features. Optional features on the 5340 allow up to 16 workstations to be directly attached. The 5252 represents two workstations. The maximum length of any one twinaxial cable is 1,525m (5,000 ft). Up to three such cables may be attached to the 5340. Multiple workstations (up to seven) may be attached to one cable via Cable-Thru (#2680) with each workstation. If a 5256 Printer is designated as the system printer, a 6m (20 ft) cable is provided with the 5340. Specify #9306 on the 5340. See "Specify" in the M5340 pages. See "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337), for additional cabling information.

For Direct Attachment to S/36: The 5256 Printer may be attached to the S/36 in a manner similar to 5250 Information Display Station devices. See "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337), for additional cabling information.

For Direct Attachment to S/38: The 5381 System Unit provides eight cable connectors for attachment of the 5219, 5224, 5225, 5251 mdl 1 and 11, 5252, 5256, 5291, and 5292, and supports up to 12 of these workstations. Optional features on the 5381 allow up to 80 workstations to be attached. The 5252 represents two workstations. The cable attachment is made with twinaxial or shielded twisted-pair cable. Maximum length of any one cable is 1,525m (5,000 ft). Up to seven workstations may be attached to a cable via Cable-Thru (#2680) on each workstation. All cable-thru devices on a single cable must be of the same cable type. The 5251-1 and 5252 devices require twinaxial cable. See "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337), for cabling information.

Clustering: The 5256 may be attached to the 5251 mdl 2 or 12 with the Cluster (#2550) or the Dual Cluster (#2551). The Cluster feature allows attachment of up to four workstations (5219, 5224, 5225, 5251 mdl 1 or 11, 5252, 5256, or 5292), and the Dual Cluster feature allows attachment of up to eight workstations. The 5252 represents two workstations. The 5256 may also be attached to the 5294 workstation controller. See M5294 pages for workstation attachment limitations. See "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337), for cabling information.

Publications: "IBM 5250 Information Display System Introduction", (GA21-9246) and "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337).

SPECIFY

- Voltage: One must be specified.

50Hz		60Hz	
100V	#2804	100V	#2730
110V	#2805	115V	#9901
123.5V	#2811	200V	#2732
200V	#2806	220V	#2803
220V	#2813		
235V	#2814		

- Power Cord and Plug: For a power cord with a standard plug, specify #2709. The plug available for each country is described in the "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337). If a standard plug is not listed for your country or is not desired for your customer, specify #2710 for a power cord without a plug.
- Color: Pearl White only (no specify required).
- Language Group: Includes nomenclature and print graphics. Character sets are 95 print graphics except where noted. See "Type Catalog" for character set arrays. Specify one of the following:

Brazilian	#2975
Canadian French	#2977
EBCDIC	#2956
French	#2964
German	#2957
Italian	#2968
Japanese English	#2955
Japanese Katakana (129 characters)	#2973
Multinational (184 characters)	#2990
Portuguese	#2959
Spanish	#2960
Spanish Speaking	#2961

- Character Set: All workstations and printers attached to a S/34, S/36, and a 5251 mdl 2 or 12 must have the same character set. All workstations attached to the same 5250 Information Display System Attachment must have the same character set. However, multiple attachments may be configured differently. (Japan only> The Multinational Character Set does not include Katakana characters.<)
- Cables: See "Accessories" for cable ordering instructions. For cable specifications, see the IBM 5250 Information Display System Planning and Site Preparation Guide (GA21-9337), and the IBM Cabling System - Planning and Installation Guide (GA27-3361). Specify #9050 if cable is ordered from IBM, #9055 if cable is ordered from another supplier, #9060 if the 5256 is used with S/34, S/36 as the system printer (no cable order required), or #9065 if existing cable will be used (no cable order required).
- System Attachment: Specify the unit to which the 5256 is attached: #9559 for 5251 mdl 2, #9560 for 5251 mdl 12, #9561 for 5340, #9565 for S/36, #9562 for 5381, or #9564 for 5280.

SPECIAL FEATURES

Audible Alarm (#1470): Provides an audible indication to the operator when manual intervention is required. Maximum: One. Field Installation: Yes.

Cable-Thru (#2680): Provides the capability of connecting multiple 5219s, 5224s, 5225s, 5251 mdls 1 or 11, 5252s, and 5256s to a single cable. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and 5252 devices require twinaxial cable. Each unit on the cable, except the last, requires this feature. Note: For relocation flexibility, the customer should have Cable-Thru on all workstations. Maximum: One. Field Installation: Yes.

MODEL CONVERSIONS

Model conversions are field installable.

ACCESSORIES

Forms Stand (#4450): Permits feeding of continuous forms from a carton and provides for forms stacking on a single shelf after printing. This accessory is a one-shelf forms stand. For field installation, order by feature number on MES.

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for product attachment. Twinaxial cable is required for attachment to the 5340, 5251-2. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to IBM Cabling System - Planning and Installation Guide (GA27-3361). For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337). When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Individual connectors, P/N 7362229, are available for replacements.)

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. This is an indoor/outdoor cable.

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector Kit (B/M 7361807): A kit includes two protectors. One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes. The station protector is a CSU accessory.

SUPPLIES

Ribbons: A black ribbon, P/N 1136653 or equivalent, is required. A black cartridge ribbon, P/N 7034535 or equivalent, is required for all machines shipped on or after September 19, 1980 or on machines having RPQ D09005 installed. Contact IBM.

MACHINES
5258 PRINTER
PURPOSE

An ink jet printer providing high-quality printer output for the 5520 Administrative System. A selection of print fonts is available to provide 10 pitch, 12 pitch, or proportional spacing of an international set of graphics.

MODELS
Model 1 001

Prerequisites: In the 5525 System Unit, Local Device Control feature (#4710, #4711, #4712); LDC Attachment feature #4715; and either feature #1105, #1700, #1701, #1702, or #1704. See M5525 pages for details.

HIGHLIGHTS

- Automatic feeding of cut sheet paper from two drawers (e.g., letterhead and plain) and envelopes from a hopper.
- Rated burst print speed of up to 92 characters per second (12 pitch).
- Horizontal spacing of 10 pitch, 12 pitch, or proportional.
- Vertical spacing is 5-1/3 and 6 lines per inch and half-line spacing for superscripts and subscripts (single level).
- One type style font standard, two more selectable (at time of manufacture), and a further two optional (possible five in total); each supports 187 characters from English and eight other language character sets (Artisan 10 U/C English only). Optional print font supports Greek alphabet and other symbol characters.
- Type style and format may be chosen by the user and then automatically changed under program control.
- Standard Cable-Thru capability to allow multiple printers (5219s and 5258s) to be multidropped from the 5525 System Unit on a single twinaxial or shielded twisted pair cable.
- The printer is equipped with an envelope hopper and two paper drawers. The envelope hopper holds 600 75 g/sq.m (20 pound) bond envelopes. The envelope stacker holds 500 envelopes of the same weight. The paper drawers hold 600 sheets of 75 g/sq.m (20 pound) bond or 500 sheets of 90 g/sq.m (24 pound) bond each. The paper stacker holds 700 sheets of 75 g/sq.m (20 pound) bond.

Paper Specifications:

Paper sizes include:

- 182mm x 257mm (7.17 inches x 10.12 inches) *
- 197mm x 273mm (7.75 inches x 10.75 inches) *
- 203mm x 254mm (8 inches x 10 inches)
- 210mm x 297mm (8.27 inches x 11.69 inches)
- 216mm x 279mm (8.5 inches x 11 inches)
- 250mm x 353mm (9.84 inches x 13.9 inches)
- 257mm x 364mm (10.12 inches x 14.33 inches)

* Feed lengthwise only

Paper weights include:

- 60 g/sq.m (16 pound) bond
- 75 g/sq.m (20 pound) bond
- 90 g/sq.m (24 pound) bond

Envelope Specifications:

Envelopes made from bond paper in substance weights from 48 through 90 g/sq.m (13 pound to 24 pound) can be fed. The size of envelopes which can be fed ranges from 98.4mm to 114.3mm (3.875 inches to 4.5 inches) in width and 190.5mm to 241.3mm (7.5 inches to 9.5 inches) in length.

Problem Determination Procedures: Problem determination (and recovery) procedures are provided by IBM with the 5258 Printer, and extended when attached to the 5525 System Unit using Licensed Program 5611-SS1 or 5611-SS2 to help provide increased availability of the printer, and other parts of the system, to the user.

These procedures are described in the reference cards accompanying the printer, in the HELPs and Messages facilities of the licensed program, and in *IBM 5258 Printer Operators Guide* (GA23-1005) and *IBM 5520 Administrative Systems Messages and Recovery Aids* (SC23-0733 or SC23-0748).

These procedures are designed to be easy to follow and use by the customer, and it is the customer's responsibility to use them prior to calling for IBM service.

Publications: *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1011), *IBM 5258 Operator Guide* (GA23-1005) and *IBM Cabling System - Planning and Installation Guide* (GA27-3361).

Customer Responsibilities: The customer is responsible for providing and installing requisite cabling and for providing paper and envelopes as appropriate prior to the installation of the printer by the CE; also for following the problem determination procedures prior to calling for the CE.

Operator intervention is required for replenishing the ink supply, paper, and envelopes, and handling exceptional conditions such as feed jams, stacker full, power on/off, and invalid format requests.

When adding additional printers to the 5520 Administrative System, the customer may have to modify the system configuration specifications. See *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1002 or GA23-1011).

Cabling: When used with the 5520 Administrative System, the 5258 is connected via a twinaxial cable to local device attachment connectors in a protected customer access area on the 5525 System Unit. Depending on the 5525 mdl, up to eight printers can be multidropped on the same twinaxial cable up to a maximum length of 1,524 cable-meters (5,000 cable-feet). Depending on the mdl, up to eight cables (maximum of 12 printers) can be attached to the 5525. See M5525 pages. Refer to the *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1011) or the *IBM Cabling System - Planning and Installation Guide* (GA27-3361) for maximum length of shielded twisted pair cable.

SPECIFY

- Voltagcs:

50 Hz	60 Hz
123.5V #2811	115V #9901
200V #2806	120V #9911
220V #2813	240V #9914
240V #2801	

- Power Cord: Line cord is shipped without plug. No specify required.
- Cover: No specify required.
- Operator Console: One language code for the console panel (operator guidance) must be selected.

Canadian French	#2977	German	#2957
English US	#2956	Italian	#2968
French	#2964		
- Print Fonts: Available at time of manufacture only. Prestige Elite (12 pitch) is standard on every machine. Two additional fonts must be selected using specify numbers from the following. See "Type Catalog" for character set arrays.

Font (select two)

Pitch	Style	Feature Number	Specify Number
12	Letter Gothic	#7809	#9809
10	Courier	#7811	#9811
12	Courier	#7810	#9810
10	Courier Italic	#7825	#9825
12	Courier Italic	#7826	#9826
10	Prestige Pica	#7812	#9812
10	Artisan	#7813	#9813
10	Artisan (U/C)	#7822	#9822
10	Bookface Academic	#7824	#9824
PSM	Essay	#7814	#9814
PSM	Arcadia	#7815	#9815
PSM	Boldface	#7816	#9816
10/12	Symbol	#7830	#9830

The symbol font allows printing of symbol characters supported by keyboard IDs #202 and #204. See "Type Catalog" for details of these keyboards.

- Color: Pearl White with Pebble Gray accents. (No specify required.)

5258 Printer (cont'd)

- Cables: Customer-supplied; see "Accessories" and the *IBM 5520 Administrative Systems Installation Manual - Physical Planning* (GA23-1002 or GA23-1011) for ordering information. Specify #9050 if cable is ordered from IBM or #9055 if cable is ordered from another supplier.
- Data Rate: The data transfer rate is determined by the Local Device Control feature and the 5525 System Unit mdl. Specify #9300 for printers attaching through feature #4710 on the 5525 mdl 020 or 021; #9305 for printers attaching through feature #4710 on the 5525 mdl 030, 031, or 032; and #9315 for printers attaching through feature #4711 or #4712 on any mdl 5525.
- Radio Frequency Interference (RFI) Filter: Specify #2759.

SPECIAL FEATURES

Optional Additional Print Fonts: Up to two optional print fonts may be ordered from the font list given in "Specify". Purchase only. Order by feature number. **Field Installation:** Yes.

MODEL CONVERSIONS (None)**ACCESSORIES**

Cables: The cables and/or associated parts to attach the 5258 to the 5525 may be purchased from IBM or from a customer-selected source. For the proper identification, installation, and application of the subject cables and parts, see the *IBM 5520 Administrative System Installation Manual - Physical Planning* (GA23-1002 or GA23-1011). The customer is responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5525.

Twinax™ Connector Kit (P/N 7362268): Includes two connectors. Twinax Wire and one connector kit are required for each attachment cable. (Individual connectors P/N 7362229 are available for replacement.)

Twinax Wire (P/N 7362211): Order must specify the desired length. Twinax Wire and one connector kit are required for each attachment cable. (This is an indoor/outdoor cable.)

Twinax Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinax Adapter (P/N 7362230): Permits two Twinax Cable Assemblies to be joined together.

Twinax Station Protector (P/N 6819750): One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Note: This station protector is different from that used with the displays.

SUPPLIES

Ink: IBM Office System Ink (P/N 1354320) or equivalent. Contact IBM for ordering information. One bottle is included with the shipment of the machine.

5262 LINE PRINTER

PURPOSE

A free-standing, stainless steel engraved band, impact line printer for attachment to a twinaxial interface utilized by the S/34, S/36, S/38, and the 5294 Remote Control Unit.

MODELS

Model 1 001: Free-standing impact line printer output unit.

Limitations

- The 5262 print band is unique and not interchangeable with the 3262 mdls B1 and C1 because of timing mark differences.
- Only pinfed, continuous forms can be used.
- Both edges of the forms must be engaged by the forms pinfeed tractors.
- No staples are permitted in the areas exposed to the interchangeable print belt.
- Printer operation and print quality vary with paper and number of copies. Form sets of more than four parts (one part with 128-character text print bands) should be tested under operating conditions to verify that results are satisfactory. Maximum forms thickness is 0.51mm (0.020 inch).
- Because of the complexity of certain characters on the multinational print bands, multipart forms should be tested in operating conditions to ensure satisfactory results.
- Multipart forms are not recommended for OCR printing. The print quality of the top sheet is affected by the underlying sheets. Under no circumstances should the copy sheets be used for optical scanning. For best results, use 75-90g/sq.m (20-24 lb.) OCR bond in single-part forms for OCR printing. OCR forms utilizing other papers should be tested for satisfactory results with user requirements. When reading 5262 documents on the 3886, reread-on-reject capability and 3211/5211 Compatibility (#9701) should be used on the 3886. OCR printing is limited to controlled DP room environment. Refer to system planning guides and to Forms Design Reference Guide for Printers (GA24-3488). The OCR feature (#5450) is a prerequisite for OCR Applications.

Prerequisites: An available twinaxial port on a 5294 or S/34, S/36 (5360, 5362, and 5364), or S/38.

Customer Setup (CSU): The 5262 mdl 1 is designated as a Customer Setup Unit (CSU), thereby offering early availability and relocation flexibility.

Customer responsibilities are set forth in Information Bulletin for Customers - Customer Setup (G120-2743). CSU instructions are included with each 5262. The 5262 CSU allowance is one day.

Customer Responsibilities: Marketing representatives must advise customers of their responsibilities before receipt of the machine.

The customer is responsible for:

- Adequate site, system and other-vendor preparation.
- Receipt at the customer's receiving dock, unpacking and placement of the 5262.
- Physical setup, connection of cables, switch settings and checkout in accordance with instructions enclosed with the machine.
- Notifying IBM of intent to relocate and following IBM instructions for relocation.

- Using the problem determination procedures.
- Disconnecting, packing and removal to the customer's shipping dock at the time of discontinuance. Appropriate instructions will be provided by IBM.
- Replacing a worn print band with the spare provided. Rotating the platen per the instructions provided with the printer. Ordering another (spare) band when worn band is replaced.
- Procurement, installation, and management of the twinaxial loop network, see "Accessories" below.

When adding additional printers to the S/34, S/36, S/38 or 5294 Remote Control Unit, the customer may have to modify the system configuration. See System/34 Program Product Installation and Modification Reference (SC21-7689), IBM System/36 - Changing Your System Configuration (SC21-9052), and System/38 - Guide to Program Product Installation and Device Configuration (GC21-7775).

HIGHLIGHTS

A free-standing, engraved steel band, impact line printer for attachment to a twinaxial interface utilized by the S/34, S/36, S/38, and 5294 Remote Control Unit. 132 print positions are standard. Horizontal spacing is ten characters per 25.4mm (inch). A fine horizontal vernier adjustment is provided to allow the operator to horizontally position printed characters in predetermined print positions. Maximum movement of this vernier is one and one-half print positions or 3.8mm (0.150 inch). Vertical spacing is six or eight lines per 25.4mm (inch) for the mdl 1. Forms skipping and spacing are program controlled. The carriage is a single-speed unit allowing skipping up to 508mm (20 inches) per second. Continuous forms are fed by a set of forms tractors, which accept forms up to a maximum of 406.4mm (16 inches) wide. See Forms Design Reference Guide for Printers (GA24-3488), for forms design considerations. A 288-character band image buffer is standard. Print band images (for character set changes) are loaded from 5262 internal storage selected by operator panel control. All standard feature character sets (band images) are stored, custom character sets and bands are handled via RPO. The twinaxial Cable-Thru is standard as is an audible alarm that announces the need for manual intervention or problem determination.

Performance Considerations: Actual printer throughput is dependent upon operational and programming characteristics. These factors must be considered in determining actual throughput:

- System Configuration:
 - Transmission speeds
 - Multiple device operational loads
- Application Processing:
 - Data organization
 - Output format; skipping ... spacing ... print line length, Character set size of print band and application program.

Programming Support: Existing 5256 printer support on the twinaxial interface applies.

Print Bands: Operator-interchangeable print bands* are available that offer the following character sets and nominal rated speeds:

Character Set Size	Nominal Rated Speed (in lpm), Mdl 1
48-character set	650
64-character set	466
96-character set	363

(94 printable)
116/128-character set 252
188-International character set 130

* 3262 print bands can not be used on the 5262.

A general-purpose optimized 63-character set print band is available which can provide speeds of up to 625 lpm. The expected performance of the 63-character band is not determinable unless sample data streams are printed. It is possible that the performance could be less than the standard 64-character band if the low frequency occurrence characters are printed frequently by the application. See 5262 Product Description Manual (GA24-3975).

Two special Distributed Office print bands are available:

- Canadian French
- Japanese Katakana

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of problem determination and recovery routines and procedures that are easily understood and used by the operator. See responsibilities in "Customer Setup" section above.

System Attachment: The 5262 Printer attaches to a S/34, S/36 (5360, 5362, and 5364), or S/38 using the twinaxial interface.

For Direct Attachment to S/34, S/36, or S/38: The 5262 Printer may be attached via a twinaxial port to these systems in a manner similar to 5250 Information Display System devices. See IBM 5250 Information Display System Planning and Site Preparation Guide (GA21-9337) for cabling information.

For Remote attachment to S/36 (5360, 5362 and 5364), and S/38: The 5262 may be attached to the 5294 Remote Control Unit. See IBM 5250 Information Display System Planning and Site Preparation Guide (GA21-9337) for cabling information. The 5262 may be attached to the appropriate processor or controller via the IBM Cabling System. See IBM Cabling System Planning and Installation Guide (GA27-3361).

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture.

- Power (AC, 1-phase): Specify one of the following:

50Hz	60Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	115V #9911
220V #2813	120V #9911
230V #2821	127V #2823
240V #2801	

For Canada and Japan, specify #9890 for locking plug or #9891 for nonlocking plug for voltages under 200V. For other countries the 3-digit Country Code on the DP Machine Order is used to select a power plug which matches the most commonly used power supply and plug in each country. If an exception is required, a Country RPQ may be initiated.

Note: If a power plug, not the most common, is specified, and it is incompatible with the power plug commonly supplied, a power cord without a plug will be shipped unless the above referenced country RPQ is initiated.

- Power Cord: If standard 4.3m (14 foot) power cord is not required, specify #9511 for 1.8m (6 foot) power cord.
- Color: Will be pearl white, accent covers will be classic blue. No specify required. Other accent colors are available by plant only RPQ.
- Machine nomenclature:

One of the following must be specified:

Brazilian #2933 Japanese #2930
Canadian French #2935 Spanish #2931
English US #2924

- Host Designation (specify one):

#9101 for Series/1
#9140 for System/34
#9100 for System/36
#9145 for System/38

- Cables: The customer is responsible for procurement, maintenance and installation of twinaxial signal cable. See "Accessories" for ordering instructions

- Print Band Character Set: Select one band type by specifying one number from feature Group A (character set size), one number from Group B (language) and one number from Group C (character height). When printing eight lines per 25.4mm (inch) vertically, the 2.0mm (0.079 inch) character height is recommended. Two print bands of the same specify code will be shipped with the printer. These two bands supplied at time of manufacture only. The second band will be a spare for use by the customer as a back-up. When the customer installs this back-up band, the customer is expected to order a replacement via an MES. Billing will be at the current accessory band price. With band installation, customer rotates the platen as described in the instructions provided with the printer. If the customer desires to have an IBM service representative replace or install the print band, or rotate the platen, the time involved will be billed to the customer. See "Print Band, Add'l" in "Accessories" section if more than one band is required.

Group A

Character Set Size	Specify Number
48-character set EBCDIC	#2767
48-extended character set, 52 graphics	#2765
64-ch.set EBCDIC	#2768
63-ch.set EBCDIC (optimized)	#9523
96-ch.set EBCDIC	
(94 printable)*	#2770
188-ch.set International*	#9135
60-char. set S/38 Special control language characters**	#9521
116-ch.set Canadian French*	#2779
128-ch.set Japanese Katakana*	#2873

* Available only with 2.4mm (0.095 inch) character height #9950

** Available with English U.S./Canada #2956 only.

Group B

Language	Specify Number
Brazilian	#2975
Canadian French	#2977
English US/Canada	#2956
FORTTRAN**	#9565
International	#2950
Japanese English	#2955
Japanese Katakana	#2973
Multinational*	#2990
Spanish Speaking	#2961

* Available only with 2.4mm (0.095 in.) height (#9950) and 64 (#2768), and 96 (#2770) sets.

** Available on S/34 and S/36 with 2.4mm (0.095 in.) height and 48-character set size.

Group C

Character Set Height	Specify Number
2.4mm (0.095 inch)	#9950
2.0mm (0.079 inch) *	#9951

* Recommended for printing eight lines per 25.4mm (inch) vertically.

SPECIAL FEATURES

OCR Print Feature (#5450): Provides a manual setup for OCR print applications. The OCR feature is a prerequisite for OCR applications. OCR Print (#5450) is available for the following language codes only.

Code Language	OCR-AON	OCR-BON
#2956 Canadian/US EBCDIC	Yes	Yes
#2955 Japanese English	No	Yes
#2973 Japanese Katakana	No	Yes
#2961 Spanish Speaking	Yes	No

One of the following OCR bands (numerics only) must be specified.

OCR-AON 48 Char. Set (Note 1)	#0901
OCR-BON 48 Char. Set (Note 1)	#0902
OCR-BON 128 Katakana Set (Notes 1&2)	#0903

Notes:

1. Non-OCR characters are 2.4mm (0.095 inches) in height
2. (Japan only) > #2973 <

Two OCR print bands (OCR numerics and specials only) will be shipped with #5450, and are in addition to the bands shipped with the basic printer. The second OCR band is also a spare for use by the customer for backup. When the customer installs this backup band, the customer is expected to order a replacement via an MES. Billing will be at the current accessory band price. Warranty and ordering of additional bands is the same as for non-OCR bands shipped with the printer. Field Installation: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES

The following items are available on a purchase only basis. Order the feature number indicated below, at the price listed in the Price List. Order by MES, only one type of print band per MES.

Print Band, Add'l: Additional print bands permit the customer to print more than one character set and/or language, and can be used interchangeably with the bands provided with the machine. OCR bands are available for printers with OCR feature #5450, and for language codes #2755, #2756, #2757, #2758, #2761, #2762, #2763, #2764, #2773, or #2788 in Table B following. The specified languages for OCR must be the same as specified for the bands ordered with the basic machine. When ordering, order one feature for character set size (Table A), one feature code for language (Table B), and one feature code for character set height (Table C). Order via MES, only one band part number per MES. Installation and replacement of print bands is the customer's responsibility. If customer desires to have an IBM service representative replace or install the print band, the time will be billed to the customer.

Table A

Character Set	Feature Number
---------------	----------------

48 EBCDIC	#5940
48 OCR-AON (numeric & specials) *	#5974
48 OCR-BON (numeric & specials) *	#5975
60 S/38 Special Ctl. Lang. char. **	#5943
64 EBCDIC	#5944
63 Optimized EBCDIC	#5946
96 (94 printable) EBCDIC *	#5948
188 International *	#5962
116 Canadian French *	#2878
128 Katakana *	#2875
128 OCR-BON Katakana *	#0703

* Available only with 2.4mm (0.095 inches) character height.

** Available only with Canada/US EBCDIC #2756.

Table B

Language Group	Feature
Multinational *	#2790
International	#2750
FORTTRAN ***	#5965
Brazilian	#2775
Canadian French	#2777
Canadian/US EBCDIC	#2756
Japanese English	#2755
Japanese Katakana	#2773 **
Spanish Speaking	#2761

Available only with 96- or 128-character sets (#5948 or #2875)

* Available only with 2.4mm (0.095 inches) height (#5950) and 64 (#5944), and 96 (#5948).

*** Available on S/34 and S/36, 0.095 inch height only.

Note: For mdl 1 only, one Language Code (Table B) per printer. Multiple languages on one printer are on an RPQ basis only.

Table C

Character Height	Feature Number
2.4mm (0.095 inches)	#5950
2.0mm (0.079 inches)	#5951 *

* Recommended for printing eight lines per 25.4mm (inch) vertical.

Cables: The twinaxial cable or data-grade twisted-pair cable is required for product attachment. Cable and associated accessories may be purchased from IBM or from a customer-selected source. The customer is responsible for the installation and maintenance of these cables and their associated accessories. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5262.

Twisted-Pair Cable: For identification, installation, and application of cable and accessories, refer to IBM Cabling System Planning and Installation Guide (GA27-3361). For order and price information refer to IBM Cabling System Catalog (G570-2040).

Twinaxial Cable: For identification, installation, and application of cable and accessories, refer to IBM 5250 Information Display System Planning and Site Preparation Guide (GA21-9337).

Twinaxial Connector Kit (P/N 7362268): Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. Kit includes two connectors. Individual connectors, P/N 7362229 are available for replacements.

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Twinaxial Wire (P/N 7362211): Order must specify desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. This is indoor/outdoor cable.

Twinaxial Cable Assembly (P/N 7362267): includes two connectors attached to bulk cable. Required cable length must be specified on order. Price of cable is added to the fixed assembly price to obtain the total price of the Twinaxial Cable Assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector Kit (P/N 7361807): Kit includes two protectors. One is required on each end of each twinaxial cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426 are available for replacement purposes. The Station protector is a CSU accessory.

SUPPLIES

Ribbons: A black ribbon, P/N 7819690, or equivalent, is required. An OCR ribbon P/N 7032877 or equivalent is required for OCR printing.

5265 POINT OF SALE TERMINAL
PURPOSE

A Point of Sale Terminal which serves the cash register and data logging (store and forward) functions in sales-oriented establishments. Contains diskette assembly for recording detailed sales transaction information. The diskette is removable and can be transported to a host system for processing of the stored data. Communicating models allow direct batch communication of stored data to Series/1, System/3 models 4, 6, 8, 10, 12 and 15, System/32, System/34, System/36, S/370 models 115 through 195, 3031, 3032, 3033, 3741 models 2 and 4, 3747, 5110,.

MODELS

Mdl	Base Storage	Keyboard Keys	Diskette Type	Communications	5266 Attachment
A11	16K	34	1		
A12	16K	34	1	Yes	
A21	16K	34	1		Yes
A22	16K	34	1	Yes	Yes
A31	16K	34	2D		
A32	16K	34	2D	Yes	
A41	16K	34	2D		Yes
A42	16K	34	2D	Yes	Yes
A51	32K	34	2D		
A52	32K	34	2D	Yes	
A61	32K	34	2D		Yes
A62	32K	34	2D	Yes	Yes
A71	64K	34	2D		
A72	64K	34	2D	Yes	
A81	64K	34	2D		Yes
A82	64K	34	2D	Yes	Yes
B11	16K	64	1		
B12	16K	64	1	Yes	
B21	16K	64	1		Yes
B22	16K	64	1	Yes	Yes
B31	16K	64	2D		
B32	16K	64	2D	Yes	
B41	16K	64	2D		Yes
B42	16K	64	2D	Yes	Yes
B51	32K	64	2D		
B52	32K	64	2D	Yes	
B61	32K	64	2D		Yes
B62	32K	64	2D	Yes	Yes
B71	64K	64	2D		
B72	64K	64	2D	Yes	
B81	64K	64	2D		Yes
B82	64K	64	2D	Yes	Yes

Note: The user of a 5265 model X3X, X4X, X5X, X6X, X7X or X8X should review the host diskette support to ensure that Diskette 2D capability exists. See *IBM 5260 Retail System-Systems Planning Guide* (GA21-9390), for additional information.

Customer Setup (CSU): The 5265 is designated as a customer setup device thereby offering the customer early availability and relocation flexibility. For additional information on CSU, contact IBM.

HIGHLIGHTS

- 34-key or 64-key keyboard. See "Models".
- Personalization of function at each terminal allows customers to modify operations performed to meet their requirements.
- Easily readable transaction display.
- Automatic prompting for operator guidance.
- Diskette assembly to record sales transactions.
- Total Accumulations:
 - Up to 86 personalizable machine totals (including realtime and machine totals). With Extended Protected Totals (#3650), all of these are protected from external power interruptions. If the controlling 5265 terminal has #3650 installed, it is recommended that all attached 5266 terminals have #3650 installed also. 5265 mdls X5X, X6X, X7X and X8X have extended protected totals and do not require #3650.
 - Up to 256 auxiliary totals.
 - Non-resettable machine grand total.
- Cash Receipt/Document/Transaction Journal printing.
- Store Logo Printer available. See "Special Features".

- Up to two cash drawers available: Both attached, both remote, or one attached and one remote. See "Special Features".
- Time-of-day clock.
- Capability to attach up to five 5266 terminals (mdls X2X, X4X, X6X and X8X only) or up to four 5266 terminals and a 5265 which can provide backup if required. An additional five terminals can also be installed via special features on mdls X4X, X6X and X8X.

Information from up to five 5266 Point of Sale Terminals (attached via twinaxial cable) can also be stored on the 5265 diskette assembly (mdls X2X, X4X, X6X, and X8X only). By special feature, up to ten 5266s can be attached (mdls X4X, X6X and X8X). One 5265 will collect data from all the attached terminals.

- Communications to host system available. See "Models".
- Formatted data entry with optional totals accumulation, by field within format.
- Price look-up (with override capability) and Negative Credit files.
- Additional memory available, up to a total of 128K (mdls X7X and X8X only).
- Sharing of data files by all terminals in the cluster (mdls X6X and X8X only).
- Central site control file (mdls X5X, X6X, X7X and X8X only).
- Administrative message support (mdls X5X, X6X, X7X and X8X only).

Features

Keyboard: Allows key entry of cash register (sales) information, as well as entry of administrative data, non-sales oriented data and specification of non-sales function. All 5265 AXX mdls are equipped with 34 keys; all BXX mdls are equipped with 64 keys (basic 34 keys plus additional function keys) to simplify specifying of operator functions. Available with either Touch-Tone[®] style or adding machine style numeric keyboard arrangement. Function key arrangement may be modified by personalization to meet customer's needs. Key identifiers appear on a plastic overlay which can be modified to indicate keyboard layout as assigned by the customer. Use of unique function keys (salesperson and merchandise ID) requires Storage Increment (#4902) or mdl X5X, X6X, X7X or X8X.

Personalization: Allows customers to modify the functional operations performed at a given point of sale. By answering a series of questions (found in the Personalization Questionnaire) customers can alter functions and tailor the operation to match their requirements. Answers to personalization questions need only be entered once via the 5265 keyboard (at time of initial installation) and are stored on a diskette for use until a change is desired. Personalization is loaded from the 5265 diskette to the storage of the same 5265 or any attached 5266 or 5265. Values are assigned as defaults (preset values) for many questions; if no answer is given by the customer for a personalization question its default value is assumed. This allows the user to implement many functions as supplied by IBM, thus saving time in answering personalization questions, and in key entry of the answer.

Transaction Display: Shows details of sales transactions. An 8-position LED display shows transaction details as entered for such things as department, class, stock, quantity, total, amount due and change. Nine indicator lights identify AMOUNT DUE, SUBTOTAL, CHANGE, and REFUND, or call attention to machine status.

Operator Guidance Unit: Leads the salesperson through sales and non-sales transactions by offering a prompt for each action in sequence. The prompting drum has up to 24 prompts visible (one at a time) to the salesperson.

Totals: A non-resettable Grand Total is automatically maintained. Through personalization, the following types of totals can be selected for accumulation: Control totals (basic accounting totals), transaction type, tender type, salesperson, and merchandise totals. These totals, referred to as realtime totals, are maintained in machine storage and can be accessed individually or in groups at any time. Up to 52 realtime totals can be accumulated in the basic machine mdls X1X, X2X, X3X, and X4X and up to 86 if Storage Increment (#4902) is installed. All machine mdls X5X, X6X, X7X and X8X support up to 86 realtime totals.

Ten totals are protected from loss in the event of external power interruption on mdls X1X, X2X, X3X and X4X. With Extended Protected Totals (#3650) or machine mdls X5X, X6X, X7X or X8X, all totals are protected. Auxiliary Totals can be generated from data stored on the diskette transaction log. These totals are calculated, typically at

5265 Point of Sale Terminal (cont'd)

the end of the sales day, by processing the diskette in the 5265. Three groups of Auxiliary Totals are predetermined: Auxiliary control, transaction type and tender type. Three other groups can be personalized: Salesperson, merchandise group and merchandise item totals.

Transaction Log Data Entry: Provides the capability of entering formatted data onto the diskette transaction log. Field entry requirements are personalized, as well as the capability of accumulating subtotals and totals by field within formats.

Cash Receipt/Document/Transaction Journal Printing: Uses 80 cps bidirectional matrix printer. Can generate up to 31-character print line on either a cash receipt or a customer-inserted document (sales check form or document to be endorsed), and on the transaction journal roll.

Time-of-Day-Clock: Used to automatically record on the transaction log the time each transaction occurs. Initially set by salesclerk via sign-on procedure.

Diskette Storage Capacity: Is available in two capacities of the standard removable Diskette 1 (.24MB) and Diskette 2D (.98MB). See "Models" for a list of mdls supporting each capacity. Either capacity diskette provides storage for operational (sales and non-sales) instructions, personalization tables, customer transaction log, and customer files. Diagnostic/exercisers are also resident on the diskette.

Binary Synchronous Communications (BSC): Capability on all XX2 machine mdls allows sales transaction log data collected at the 5265 to be forwarded to a system. Allows transmission of price look-up files and/or negative credit files from a system to the 5265. Requires one of the following on the 5265:

- External Modem Adapter feature.
- 1200 bps Integrated Modem, Switched Network, Auto-Answer feature.

MDls X52, X62, X72 and X82 have the capability of receiving personalization updates, data file updates and administrative messages via the central file. An option is provided to automatically update personalization and the files and print the messages immediately following the transmission.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the *IBM 5260 Retail System Display Prompts and Problem Determination Procedures* (GA21-9399). Also, see "Customer Responsibilities" below.

Customer Responsibilities:
Physical Setup:

- Receipt at the customer's receiving dock, unpacking, and placement of the 5265.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM.
- Providing a counter or table-top to support the 5265.
- Installation and maintenance of twinaxial cables and associated parts for attaching a 5266 to the 5265 or to other 5266s.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5265.
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packaging materials (B/M 7365845) (if required) will be ordered from IBM.

The customer must be advised that:

- The customer is responsible for making arrangements for installation, pricing, charges of the data communication facility, and attachment of selected data sets.
- Toll charges, if required for installation and/or maintenance or BSC, are to be paid by the customer.
- The IBM Marketing Representatives must have the customer obtain a firm installation date for transmission services (including modems and/or data coupler, if required) before the order for a communicating mdl of 5265 can be confirmed. For further information, refer

to "Teleprocessing Systems" in the GI section, M2700 pages, and *IBM 5260 Retail System Planning and Site Preparation Guide* (GA21-9391).

Personalization: The customer must personalize the 5265 to obtain output compatible with any application programs.

Maintaining Operations:

- Using and following the Problem Determination Procedures for the 5265 prior to calling for IBM service.
- Relocation of the 5265, if required, to allow IBM service access.
- Implementation and incorporation of diskette changes into their store procedures. This includes:
 - Ensuring that the implementer at the central machine site has and is using the current level diskette.
 - Planning and coordinating the activities required for updating their store(s) to the new level diskettes.
 - Distribution of current level diskettes with their correct personalization to noncentral machine sites. Timely installation of these diskettes.

The following statement is to be included in proposals:

"It is agreed that IBM will have no responsibility to provide warranty or maintenance service on an IBM 5265 Point of Sale Terminal when cash is contained in the unit. It shall be the purchaser's (customer's) responsibility to remove, control, and replace cash so that IBM can fulfill its warranty and maintenance obligations.

The exception to the above shall be when a failure occurs in the cash drawer and it cannot be opened prior to CE maintenance. In those cases the customers shall assign one of their personnel to assume responsibility for removal of the cash once the drawer has been opened."

Special contract terms apply for the lease, rental, purchase and maintenance of the 5260 Retail System. These terms may also apply to 5260 accessories.

The specific terms that must be communicated to customers and added to agreements when marketing such products are available from Country Business Practices managers.

Environment: The 5265 Point of Sale Terminal is designed to operate in the following environment:

Temperature	10 to 37.8 degrees C (50 to 100 degrees F)
Relative Humidity	8 to 80 percent
Maximum Wet Bulb	22.8 degrees C (73 degrees F)

This machine is designed to operate in the normal retail environment. This assumes a building which is not air conditioned, but which has normal winter heat and normal ventilation. The 5265 is not recommended for outdoor usage. If it is occasionally used outdoors, it must be within the above conditions. Care must be taken to protect it from precipitation, dust, and direct sunlight.

Communications Facilities: Attachments for the 5265 BSC are designed to operate on transmission facilities such as:

- PTT public switched network.
- PTT-supplied nonswitched telephone lines (point-to-point only).
- Privately-owned communications facilities equivalent to the above.

Reference: See M2700 pages for additional information concerning modems, communications, facilities, machine attachment requirements, terminal intermix, operating capabilities, and customer responsibilities.

Publications:

- *IBM 5260 Retail System Introduction* (GA21-9284).
- *IBM 5260 Retail System Operator's Guide* (GBOF-4766).
- *IBM 5260 Retail System Implementation Guide* (GA21-9285).
- *IBM 5260 Retail System Personalization Questionnaire* (GA21-9324).
- *IBM 5265 Point of Sale Terminal Customer Setup Guide* (GA21-9321).
- *IBM 5266 Point of Sale Terminal Customer Setup Guide* (GA21-9400).



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MACHINES

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5265 Point of Sale Terminal (cont'd)

- IBM 5260 Retail System Planning and Site Preparation Guide (GA21-9391).
- IBM 5260 Retail System - Systems Planning Guide (GA21-9390).
- IBM 5260 Retail System Display Prompts and Problem Determination Procedures (GA21-9399).

SPECIFY

- Power (AC, 1-phase):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	
220V #2813	
235V #2814	

- Color: Pearl White only (no specify required).
- Language Group: Includes keyboard, displays, prompt nomenclature and printer graphics. Select one of the following:

Canadian English #2978	German #2957
Canadian French #2977	Italian #2968
English US #2956	Japanese Katakana #2973 *
French #2964	Spanish #2960

(Japan only+ * Includes capability to personalize in Katakana on 64-key keyboard (BXX) mdls. Katakana can be printed on (AXX) mdls (34-key) but the diskette must have been personalized on a (BXX) mdl machine. +)

- Value Added Tax: If desired, specify #2717. If #2717 is not specified, the machine will be equipped with U.S. style sales tax capability. If the 5265 is designated as a Central Machine (#9438) ensure that the compatible diskette(s) is specified with the Value Added Tax capability from the "5265 Configuration" below. Note: All 5265s and 5266s in the same cluster must utilize the same tax calculating method.
- Power Plug: For a power cord with a standard plug, specify #2709 (for certain countries). The plug available for each country is described in IBM 5260 Retail System Planning and Site Preparation Guide (GA21-9391). If a standard plug is not listed for your country or is not desired for your customer, specify #2710 for a power cord without a plug. (Japan only+ Specify #9880 for locking plug. #9881 for nonlocking plug. +) (Canada only+ Specify #2715 for locking plug, or #2709 for nonlocking plug. +)
- Numeric Pad: #9480 for adding machine style numeric pad or #9481 for Touch-Tone style numeric pad.
- Diskette Assembly Door Lock: A group of 11 unique lock types has been reserved to allow a customer to specify identical lock types for each terminal's Diskette Assembly Door Lock. One of the following must be specified:

#9101 Type A	#9107 Type G
#9102 Type B	#9108 Type H
#9103 Type C	#9109 Type I
#9104 Type D	#9110 Type J
#9105 Type E	#9111 Type K
#9106 Type F	

Note: If a Cash Drawer (special feature) is installed and if it is desired that the same key operate the Diskette Assembly Door Lock and the cash drawer lock, identical lock types must be specified for each.

- Central Machine (#9438) or Non-Central Machine (#9439) Designation: A central machine is one intended for use in personalizing and testing diskettes. In a multiple store environment, a central machine would be used in preparing diskettes for a group of other 5265s. Every 5265 must be designated as either a Central Machine (#9438) or a Non-Central Machine (#9439) based on this use criteria. In order to successfully complete personalization and testing of diskettes for a group of 5265s, the central machine must at least be equal to the highest level 5265 in the group. See the IBM 5260 Retail System-Systems Planning Guide (GA21-9390), for additional information. A Master Diskette(s) selected from the table that follows must be available at the central machine to provide the starting point in the personalization process for all 5265s in the group. The master diskette shipped with each 5265 is to remain with the 5265 for future use by the CE. At least one 5265 per enterprise must be designated as a Central Machine

(#9438) to ensure proper notification and distribution of all diskette changes. All other 5265s in the enterprise, not designated as central machines, must be designated as Non-Central Machines (#9439). This designation does not involve hardware. It is used to provide a location identifier for distribution of IBM-provided Master Diskette releases.

- Master Diskette Specify Code: Selection of one or more Master Diskette Specify Codes provides for the shipment of the required Master Diskette(s) to the designated central machine, plus the shipment of future Master Diskette engineering changes for the diskette(s) selected. At least one Master Diskette Specify Code from the following table, consistent with the configuration of the central machine, must be selected.

5265 Configuration:

Diskette Specify Codes

	Storage Increment	With Sales Tax Specify Code	With VAT Specify Code
5265 Mdls	#4902 Installed		
X1X	No	#9440	#9441
X1X	Yes	#9442	#9443
X2X	No	#9444	#9445
X2X	Yes	#9446	#9447
X3X, X4X	Yes or No	#9448	#9449
X5X, X6X	N/A	#9450	#9451
X7X, X8X	N/A	#9450	#9451

Prerequisites: #9438.

SPECIAL FEATURES

NON-COMMUNICATIONS FEATURES

OCR-A/OCR-B Wand Reader Attachment (#1050): Provides the facility and support to allow attachment of a customer-supplied OCR-A or OCR-B Wand Reader. The OCR-A or OCR-B Wand Reader must meet the IBM 5260 Retail System OCR-A/B Wand Attachment document available from IBM. The OCR-A Wand Reader must also meet the National Retail Merchants Association (NRMA) "Voluntary Optical Character Recognition - A Font Standard" for Universal Vendor Marking (UVM). An OCR-B Wand Reader must meet the "European Computer Manufacturers Association (ECMA-11) Standards" published in 1971. The OCR-B attachment supports and must also meet the proposed Japanese Standard Character Set Ministry of International Trade and Industry (MITI), as defined in "OCR Ticket for POS System" proposal, published by the Distribution System Research Institute, July, 1978. **Limitations:** Cannot be installed with EAN/UPC Attachment (#1055) or if #1055 is installed on any 5265 or 5266 in the same cluster. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** 16K Storage Increment (#4902) or mdl X5X, X6X, X7X or X8X.

EAN/UPC Attachment (#1055): Provides the facility and support to allow attachment of a customer-supplied EAN/UPC Reader. This feature will accommodate the digital transfer of the data translation of symbols (EAN Formulas 1, 2, 3, 4, 7, 9, 11, 12, and 13 or UPC versions dated A and E) that meet the "Specifications for Article Symbol Marking" dated September, 1977, available from European Article Number Committee Rue de la Chancellerie, Rie, 14-B TES 3-4, 1000 Brussels, Belgium; or "UPC Symbol Specifications" dated August 1978 available from Uniform Product Code Council, Inc., 7061 Corporate Way, Suite 106, Dayton, OH 45459, U.S. The EAN/UPC Reader must comply with the IBM 5260 Retail System EAN/UPC Attachment document available from country industry relations representative or from Corporate Industry Relations/Product Information. **Limitations:** Cannot be installed with OCR-A Wand Reader Attachment (#1050) or if #1050 is installed on any 5265 or 5266 in the same cluster. **Field Installation:** Yes. **Prerequisites:** 16K Storage Increment (#4902) or mdl X5X, X6X, X7X or X8X.

Customer Display (#1200): Provides an 8-digit, top-mounted, rotatable display for displaying Amount Due; Subtotal, Change, and Refund. **Field Installation:** Yes.

Second 5266 Attachment (#1300): [Mdls X4X, X6X and X8X]. Provides capability to attach a second string of up to five additional compatible 5266 Point of Sale Terminals (the last of which may be a compatible 5265 which can be used as a backup). **Maximum:** One. **Field Installation:** Yes.

5265 Point of Sale Terminal (cont'd)

Cash Drawer(s) (#1511, #1512, #1521, #1522): Provides for up to two cash drawers both attached, or both remote, or one attached and one remote. Each cash drawer consists of a housing, drawer, opening mechanism, lock, and two keys. The attached cash drawer(s) is mounted directly below the terminal and becomes an integral part of the machine. The remote cash drawer(s) consists of the same hardware plus brackets and cable for mounting under the counter. Remote cash drawers are not designed for stacked installation. The customer is responsible for installation of remote cash drawer units. When two cash drawers are installed, it is recommended that Extended Protected Totals (#3650) is also installed (except on mdls X5X, X6X, X7X and X8X) to provide protection for the Cash Drawer #2 totals.

Notes:

- Each attached cash drawer adds approximately 12cm (4.75 inches) to the height of the terminal.
- A top cover is not provided with the remote cash drawer feature; therefore, the customer must provide (by appropriate under-counter mounting) security against unauthorized access from the drawer top.

Order by the following codes:

- #1511 First Cash Drawer-Attached. **Limitations:** Cannot be installed with First Cash Drawer-Remote (#1521).
- #1512 Second Cash Drawer-Attached. **Prerequisites:** First Cash Drawer-Attached (#1511) and Storage Increment (#4902) or mdl X5X, X6X, X7X or X8X.
- #1521 First Cash Drawer-Remote. **Limitations:** Cannot be installed with First Cash Drawer-Attached (#1511).
- #1522 Second Cash Drawer-Remote. **Prerequisites:** First Cash Drawer-Attached (#1511), or First Cash Drawer-Remote (#1521) and Storage Increment (#4902), or mdl X5X, X6X, X7X or X8X.

Specify:

Cash Tills: One cash till (accessory) is supplied with each cash drawer special feature. Multiple compartment tills are available with fixed or adjustable bill and coin slots. The customer is responsible for assembly of tills with adjustable bill and coin compartments. For additional tills and lockable till covers see "Accessories". For each cash drawer ordered, specify one of the following:

- #9180 Till with fixed bill and coin slots
#9181 Till with adjustable bill and coin slots

Cash Drawers: For each cash drawer ordered, the type of lock desired must be specified. A group of 11 unique lock types is reserved to allow a customer to specify either identical lock types or unique lock types. **Note:** If it is desired that the key(s) to the cash drawer(s) also operate the Diskette Assembly Door Lock, identical lock types must be specified for each. See "Accessories". One of the following must be specified for each cash drawer ordered:

- | | |
|--------------|--------------|
| #9121 Type A | #9127 Type G |
| #9122 Type B | #9128 Type H |
| #9123 Type C | #9129 Type I |
| #9124 Type D | #9130 Type J |
| #9125 Type E | #9131 Type K |
| #9126 Type F | |

Limitations: The cable from the terminal to a remote cash drawer is 3m (9.84 feet) long. **Maximum:** Two. **Field Installation:** Yes.

Extended Protected Totals (#3650): Must be ordered or installed on mdls X1X, X2X, X3X or X4X before ordering upgrades to mdls X5X, X6X, X7X or X8X. Provides protection from external power interruptions for realtime totals. This feature increases the number of protected totals from ten to the maximum number of realtime totals available in a given machine configuration. See "Totals" under "Highlights". With this feature, all realtime totals reflect voids of current transactions; without this feature, only the first ten realtime totals are net of void current transactions (mdls X5X, X6X, X7X and X8X do not apply; totals are protected on these mdls without requiring #3650). It is recommended that this feature be included in all machine configurations, having two cash drawers or requiring more than ten totals. **Limitations:** Not available on mdls X5X, X6X, X7X or X8X. **Field Installation:** Yes.

Journal Cover and Lock (#4675): Provides a lock and key for the journal. Limits access to the journal tape. Shipped with two keys. **Limitations:** Must be unlocked to replace paper rolls and/or ribbon. **Field Installation:** Yes.

16K Storage Increment (#4902): Provides 16K of additional storage for a total of 32K on mdls X1X, X2X, X3X, and X4X. Certain functions require this feature. See "Functional Dependencies" below. With the 16K storage increment feature installed, 11K of storage is available for price look-up and negative credit files and sales tables. The price look-up and negative credit files are packed as they are loaded into the 11K of storage. It is recommended that (#4902) be installed on all X1X, X2X, X3X, and X4X machine mdls. All machines in an X2X cluster must have the same amount of storage. See the *IBM 5260 Retail System Planning and Site Preparation Guide* (GA21-9391) for details. **Limitations:** Not available on mdls X5X, X6X, X7X or X8X. When upgrading a purchased installed mdl X1X, X2X, X3X or X4X with this feature installed to a mdl X5X, X6X, X7X or X8X consult IBM for appropriate action.

Functional Dependencies

The features and functions listed below are available only on mdls X5X, X6X, X7X, X8X and on mdls X1X, X2X, X3X, and X4X with the 16K storage increment feature:

- OCR, EAN, or UPC wand.
- Price look-up and/or negative credit files.
- Second cash drawer.
- Second set of machine control totals.
- Individual cashier security codes.
- More than 52 personalized totals.
- Unique salesperson and merchandise keys.
- Check tender floor limits.
- Combined modulus checking on merchandise IDs 1, 2, and 3.
- Temporary cashier close.
- Account number entry for Cash 1 and Cash 2 transactions.
- Account or document number entry for tender types 2 through 8.
- Expanded quantity of up to five digits.
- Optional receive on transmit/receive function.
- Personalization copy procedure involving a minimum of diskette handling.

The features and functions listed below are available only on mdls X5X, X6X, X7X and X8X:

- Price look-up enhancements.
 - Field length specifications.
 - Use of ID 4; up to 30-digit key field.
 - Look-up on voids and returns.
 - Optional bypass of Amount prompt.
 - Item look-up key.
 - Merchandise ID pickup.
- Central control file.
 - Personalization and personalization control number updates.
 - Price look-up, negative credit and duplicate descriptor file updates.
 - Administrative messages.
- Account number length up to 21 digits.
- Floor limit for tender types 3 through 8.
- Authorization code up to six digits.
- Tender type descriptors.
- Copy personalization enhancements.
 - Entry of multiple copy options.
 - Personalized copy procedures.

Mdls X5X and X6X have 8K of storage available for price look-up and negative credit files and sales tables. The data files can be shared with all terminals attached to a mdl X6X.

Base mdls X7X and X8X have 8K of storage available for sales tables and price look-up and negative credit files, and an additional 32K of storage available for price look-up and negative credit files. (A 32K or 64K storage increment feature can be added on mdls X7X and X8X to increase the storage available for data files). The data files can be shared with all terminals attached to a mdl X8X. **Field Installation:** Yes.

5265 Point of Sale Terminal (cont'd)

32K Storage Increment (#4903): Provides 32K of additional storage for a total of 96K on mdls X7X and X8X. On X8X mdls, data files residing in storage can be shared with all terminals in the cluster. **Limitations:** Available only on 5265 mdls X7X and X8X. Cannot be installed with 64K Storage Increment (#4904). **Field Installation:** Yes.

64K Storage Increment (#4904): Provides 64K of additional storage for a total of 128K on mdls X7X and X8X. On X8X mdls, data files residing in storage can be shared with all terminals in the cluster. **Limitations:** Available only on 5265 mdls X7X and X8X. Cannot be installed with 32K Storage Increment (#4903). **Field Installation:** Yes.

Security Lock and Key (#6300): Provides an additional level of security with key lock control over the customer-personalizable security functions. A group of 11 unique lock types is reserved to allow a customer to specify identical lock types or unique lock types for each terminal. Shipped with two keys. **Note:** The key for the Security Lock is not interchangeable with the key for the Diskette Assembly Door, nor the key for any installed cash drawer lock. **Field Installation:** Yes.

Specify: One of the following must be specified:

#9201 Type A	#9207 Type G
#9202 Type B	#9208 Type H
#9203 Type C	#9209 Type I
#9204 Type D	#9210 Type J
#9205 Type E	#9211 Type K
#9206 Type F	

Store Logo Printer (#6500): Provides the capability to print, from a stamp type impact print device, a store logo, slogan, or other graphic at the top of the cash receipt. The maximum size of the logo, slogan, or graphic is 1.27cm (0.5 inches) vertically by 6.35cm (2.5 inches) wide. The pre-printed stamp for this print device is customer-supplied. See *IBM 5260 Retail System Planning and Site Preparation Guide* (GA21-9391) for details. Stamp ink life is dependent on ink color, lines of print, total amount of character surface, and customer acceptance of readability. **Field Installation:** Yes.

Diskette Type 1 Compatibility (#7850): Allows the following functions to be performed while using a Diskette 1. which was intended for use in the mdl A11, A12, B11, B12: Communications, Transaction Log Erase, Transaction Log Print, Auxiliary Totals, Personalization Copying, System Personalization. Allows all functions to be performed while using a Type 1 diskette which was intended for use in the mdl A21, A22, B21, B22. **Limitations:** Available only for mdls X3X, X4X, X5X, X6X, X7X, and X8X. **Field Installation:** Yes.

COMMUNICATIONS FEATURES

The Binary Synchronous Communications facilities of the 5265 mdls X12, X22, X32, X42, X52, X62, X72 and X82 operates in half-duplex mode over facilities CA2, C2, C3, DA3, D5 or K3. For information concerning these facilities, see M2700 pages.

Binary Synchronous Transmission: Permits all 5265 XX2 mdls to function as a terminal emulating either System/3 or 3741 line protocol on a switched or nonswitched point-to-point communications line.

Functions include the batch transmission of transaction information and batch receipt of certain data files. It is possible to set the terminal in Data Communication mode, and have the data communications take place unattended. The terminal will then automatically power down. There are restrictions in the ability to operate unattended. See the *IBM 5260 Retail System - Systems Planning Guide* (GA21-9390) for additional information.

Communications may be established with the following using System/3 BSC line protocol:

- Series/1
- System/3 (mdl 4, 6, 8, 10, 12, and 15) RPG II, MLMP, or CCP
- System/32 RPG II
- System/34 RPG II or BSCCL subsystem under SSP-ICF
- System/36 RPG II or BSCCL subsystem under SSPICF

Communication may be established with the following using 3741 BSC line protocol:

- 3741 (mdls 2 and 4)
- 3747
- 5110
- 5120
- 5280
- 5285
- 5288

- Series/1
- System/38 RPG III or COBOL
- S/370 (mdls 115 through 195, 3031, 3032, 3033, 4331, 4341, 4361, or 4381 via 3704, 3705 or ICA as appropriate).
- Communication with a 3741 mdl 2 or mdl 4, or with a 3747 with Communication Adapter (#1660).
- Communications with System/370, 3031, 3032, 3033, via 3704, 3705 or ICA as appropriate. Emulating 3741 line protocol, support is provided by DOS, OS/VS1 and OS/VS2, BTAM or TCAM, and CICS. 3704 and 3705 support is via a BSCA and appropriate subfeatures, under EP or NCP.
- Communications with the Series/1 is via the single-line or multiline BSCA of the Series/1. Emulating System/3 BSC or 3741 BSC line protocol, support is provided using Realtime Programming System (RPS) V3 or V4.

All 5265 XX2 mdls will operate with any of the above systems capable of communicating at the following nominal transmission rates on a point-to-point data link: 1200/600, 2000, and 2400 bps. Operation will be in half-duplex mode over dial (switched network) facilities, and in half-duplex mode over nonswitched point-to-point communications lines which may be half- or full-duplex facilities.

BSC units at each termination of a data link to which the 5265 is attached must be set to operate at the same transmission rate, and to use EBCDIC transmission code. 5265 communicating mdls support the transmission and reception of blocked records. Switched network versions include the support of Manual Dial, and Manual or Auto-Answer (where the attached modem supports this capability).

The internal clock will generate synchronizing and timing signals for BSC operation when they are not provided by the attached modem. The decision to use, or not use, the internal clock is made during personalization time. When the internal clock is used, all other devices attached to the same data link must also be equipped with similar internal clocking capability. Transmission rates of 600 or 1200 bps with internal clock are selectable at personalization time. One of two IBM modems, 3863 or 3872 mdl 1 (2400/1200 bps) may be attached to 5265 communicating mdls. For more information on the capabilities of these modems refer to the appropriate "Machines" pages.

Modem and Data Set interface to the BSC facilities of communicating mdls of 5265 are:

Facility	Speed	Type of Service	Type of Modem
CA2	1200/600	Switched	Integrated
C2	1200/600	Switched	Stand-alone
C3	2400/1200	Switched	Stand-alone
D3	1200/600	Nonswitched	Stand-alone
D5	2400/1200	Nonswitched	Stand-alone
G3	2400	Switched	Stand-alone
K3	2400	Switched	Stand-alone

In addition to the basic functions of Binary Synchronous Communications provided by 5265 communicating mdls, one of the following special features must be added: Integrated Modem (1200/600 bps) or CCITT Interface. **Field Installation:** Yes. **Prerequisites:** Systems must be equipped with an adapter from the following:

Feature Code of Communications Adapter

	#2500, #3500, or #4500	#2074	#2084	#2910	#4645 and #6202	#1501,2 and #2001,3 and #3200
System/3						
-4		X				
-6		X				
-8		X			X	
-10		X	X			
-12		X	X		X	
-15		X	X			
System/32		X				
System/34	X					
S/36 (5360)	X					
S/36 (5362)				X		
System/38						X
5110		X				
5120		X				
5280	X					
5285/5288	X					

5265 Point of Sale Terminal (cont'd)

CCITT Interface (#3701): [Mdl's XX2 only] Provides a cable and interface for the attachment of an IBM modem or PTT Mandatory Service Meeting CCITT V.24/V.28 characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. The cable is 3 meters (9.84 feet) in length. **Limitations:** Cannot be installed with 1200 bps Integrated Modem (#5500 or #5501). **Maximum:** One. **Field Installation:** Yes. (Japan only) **Specify:** #2946 when attaching a non-IBM Modem in Japan (this is to satisfy the NTT's DTE self-test requirement. +) **PTT Mandatory Services and Modems:** CCITT Interface (#3701) permits operation with the following modems or PTT mandatory services. Consult your country teleprocessing coordinator for further details.

- Used with and requiring the IBM Internal Clock:
 - 600 or 1200 bps Modems
 - 3976 mdl 3
 - Datel Switched Service Plan 32 in Australia
 - Datel Nonswitched Service Plan 32 in Australia
- Not requiring the IBM Internal Clock:
 - 2400 bps Modems
 - 3863 or 3868 mdl 1
 - 3872
- The following modems may be attached in a point-to-point (nonswitched) modem:
 - 600 or 1200 bps Modems
 - 3976 mdl 3
 - Datel Nonswitched Service Plan 32 in Australia
- The following modems may be attached for switched network operation:
 - 2400 bps Modems
 - 3863 mdl 1 or 3868 mdl 1
 - 3872
- The following modems may be attached for switched network operation:
 - 600 or 1200 bps Modems
 - 3976 mdl 3
 - Datel Switched Service Plan 32 in Australia
- The following modems may be attached for switched network operation:
 - 2400 bps Modems
 - 3863 mdl 2

Modem, 1200 bps Integrated (#5501): [Mdl's XX2 only] A modem for BSC data transmission at 1200 bps over switched facilities. Supports Manual Dial, and Manual or Auto-Answer. Attachment to the switched CA facility is via an IBM-provided cable. The cable is 3m (9.84 feet) in length. For additional details see the *IBM 5260 Retail System Planning and Site Preparation Guide* (GA21-9391). **Limitations:** Cannot be installed with Interface (#3701). **Maximum:** One. **Field Installation:** Yes.

MODEL CONVERSIONS

Any model may be field converted to any other model. Caution should be taken when upgrading models to ensure that the requirements of Central Machine Specify Codes are being met. See "Central Machine" under "Specify". When upgrading installed models X1X, X2X, X3X or X4X to models X5X, X6X, X7X or X8X, note the description associated with 5265 feature code, 16K Storage Increment (#4902). Extended Protected Totals (#3650) must be ordered or installed *before* ordering the upgrade.

Electronic parts, with the exception of memory, removed during a model upgrade to a purchased machine become the property of IBM. All other parts removed when upgrading purchased machines remain the property of the customer.

When a storage change is made to a purchased machine, any removed parts become the property of the customer.

The upgrade purchase prices for Storage Increment Features installed in the field may be greater than the difference in price between features as installed at the factory. The customers should carefully evaluate their future requirements when purchasing a terminal.

ACCESSORIES

Cash Tills: One cash till is shipped with the Cash Drawer special feature. Additional multiple compartment cash tills with either fixed or adjustable bill and coin slots are available. Order via MES including part numbers (allow eight weeks for shipment).

- Till with fixed bill and coin slots (without cover), B/M 1612499.
- Till with adjustable bill and coin slots (without cover), B/M 1612500. **Note:** Assembly of the till with adjustable slots is a customer responsibility.
- Lockable Till Cover including two keys, B/M 1612501.
- Additional key for lockable till cover, P/N 1851268.

Replacement Locks and Keys: The 5265 is equipped with a lock on the diskette assembly cover. The machine is shipped with two keys for the lock. Any cash drawer (special feature) on the 5265 is equipped with the *same lock type* as the diskette assembly cover lock. Additional or replacement keys may be purchased from a local locksmith.

Use the following part numbers when ordering replacement locks and keys:

Lock Type	Diskette Assembly Cover	Cash Drawer	Security Lock *
A	1612369	1612386	1612412
B	1612370	1612387	1612413
C	1612371	1612388	1612414
D	1612372	1612398	1612415
E	1612373	1612399	1612416
F	1612374	1612403	1612417
G	1612376	1612405	1612418
H	1612378	1612406	1612419
I	1612379	1612407	1612420
J	1612382	1612409	1612421
K	1612383	1612410	1612422

* The Security Lock and Key (#6300) must be installed *before* a replacement can be ordered. The security key is not interchangeable with the diskette assembly cover key or the cash drawer key.

Journal Lock Key: Order by machine type and P/N 1612439.

KEYBOARD OVERLAYS

Standard Overlay: The standard keyboard overlay can be modified to identify the function of the keys as defined during personalization. This overlay is initially shipped with the 5265. To order additional or replacements, order by part number.

Standard Overlay P/Ns

	----- 34 Key -----		----- 64 Key -----	
	Touch-Tone® Keyboard	Adding Machine Keyboard	Touch-Tone Keyboard	Adding Machine Keyboard
Language				
Canadian-English	1612476	1612477	1612478	1612479
Canadian-French	1610418	1610438	1610458	1610478
English US	1610411	1610431	1610451	1610471
French	1610413	1610433	1610453	1610473
German	1610414	1610434	1610454	1610474
Italian	1610415	1610435	1610455	1610475
(Japan only- Japanese	1610419	1610439	1610459	1610479 -)
Spanish	1610416	1610436	1610456	1610476

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Blank Overlay: Blank keyboard overlays are available for those customers with multiple machine installations who desire to have a local vendor silk screen them to match the personalized function. order by part number.

Blank Overlay, 34 Key, P/N 5559882
 Blank Overlay, 64 Key, P/N 5559883

Personalization Overlay: The personalization overlay fits over the keyboard and is used to identify the function of the keys during personalization. This overlay is initially shipped with the 5265.

Personalization Overlay, Touch-Tone Style Keyboard, P/N 1610371.
 Personalization Overlay, Adding Machine Style Keyboard, P/N 1610391.



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MACHINES

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5265 Point of Sale Terminal (cont'd)

Keyboard Overlay Nomenclature Kit: One kit of die-cut self-adhesive labels is shipped with each 5265. Used to modify keyboard to customer requirements.

To order additional or replacements, order by part number.

CABLES

Cables: Cables, connector, and adapters (to attach a 5266 to a 5265 or to other 5266s in the cluster) may be purchased from IBM or a customer-selected source. See *IBM 5260 Retail System Planning and Site Preparation Guide* (GA21-9391), for cable, connector, and adapter specifications. The customer is responsible for installation and maintenance of these cables. Assembled cables may be ordered from IBM. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5266s.

Twinaxial Connector Kit P/N 7362268: Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Individual connectors P/N 7362229 are available for replacements.)

Twinaxial Wire P/N 7362211: Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. This is an indoor/outdoor cable.

Twinaxial Cable Assembly P/N 7362267: Includes a Connector Kit (2 connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter P/N 7362230: Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector Kit P/N 7361807: Includes two protectors. One is required at each end of attachment cable installed outdoors (either above or below ground level).

SUPPLIES

For ordering information, contact IBM.

Ribbons: Cash Receipt/Journal Roll Printer: Black P/N 1299285, Purple P/N 1299286. Note: Black is recommended.

Roll Paper: Cash Receipt and Journal Roll, P/N 432767 (Carton of 50 rolls).

Diskettes:

IBM Diskette 1	P/N 2305830
IBM Diskette 2D	P/N 1766872

Forms: Single and Multipart cut form sales slips may also be ordered.

5271 SYSTEM UNIT

PURPOSE

The 5271 System Unit operates with the 3270 PC Control Program Version 1.2.2 (1837434), Version 2.1 (6217355), Version 3.0 (59X9968) and IBM PC DOS Version 2.1, 3.1 or 3.2 to combine the host-interactive functions of the 3270 Information Display System and the computing power and versatility of the IBM Personal Computer. The 5271 mdls 031, P31, P30, 051, P51, P50, 071, P71 and P70 require 3270 PC Control Program Version 3.0. The 5271 mdls x3x, x5x, x7x, require IBM PC DOS Version 3.1 or 3.2. The 5271 can operate with four 3270-type sessions, two local notepad sessions, and up to six IBM PC DOS sessions, except for 3270 PC Program 1.2.2 (single DOS session). The 5271 provides for the attachment of a 5271 or Enhanced PC keyboard and a display unit. The display may be a 5151 Monochrome Display or a 5272 Color Display or a 3295 Plasma Monitor. The 5271 System Unit attaches to a 3274 Control Unit or 3276 Control Unit Display Station as a category 'A' terminal.

MODELS

The 3270 PC is available in several configurations consisting of:

- 5271 System Units
- 5151 Monochrome or 5272 Color Display or 3295 Plasma Monitor (optional)
- Selected Printer (optional)

The IBM 5271 System Units are orderable as standard models. Each includes a power cord and the Guide to Operations. For Mdls x3x, x5x, x7x the Hardware Maintenance and Service Manual is separately orderable from Mechanicsburg as a supplement to the IBM Personal Computer Hardware Maintenance and Service Manual. (The IBM 3270 PC Maintenance Information Manual (SY27-2567) is included only with Mdls 002, 004, 006, 024, 026.)

The Standard Models include the above items plus the following:

| Model 002: (NO LONGER AVAILABLE)

- 256KB RAM (expandable to 640KB)
- 5151/5272 Display Adapter
- 5271 keyboard
- 3270 PC Keyboard/Timer Adapter
- One 360KB full high Diskette Drive and Adapter
- 3270 System Adapter.

| Model 004: (NO LONGER AVAILABLE)

- Standard mdl 002 features
- Second 360KB full high Diskette Drive
- Printer/Memory Adapter (with 128KB included for 384KB total).

| Model 006: (NO LONGER AVAILABLE)

- Standard mdl 002 features
- One 10MB Fixed Disk and Adapter
- Printer/Memory Adapter (with 128KB included for 384KB total).

| Model 024 (Requires 3270 PC Control Program 1.2.2): (NO LONGER AVAILABLE)

- 256KB RAM (expandable to 640KB)
- 3295 Plasma Monitor Adapter
- 5271 Keyboard Plasma Keyboard Adapter, Keyboard Overlay, and Keyboard Cable
- Two full high 360 KB Diskette Drives
- 3270 System Adapter
- Printer/Memory Adapter (with 128KB included for 384KB total)

| Model 026 (Requires 3270 PC Control Program 1.2.2): (NO LONGER AVAILABLE)

- 256KB RAM (expandable to 640KB)
- 3295 Plasma Monitor Adapter
- 5271 Keyboard, Plasma Keyboard Adapter, Keyboard Overlay, and Keyboard Cable
- One full high 360 KB Diskette Drive
- One 10 MB Fixed Disk Drive and Adapter
- 3270 System Adapter
- Printer/Memory Adapter (with 128KB included for 384KB total)

| Model 030: (NO LONGER AVAILABLE)

- 640 KB RAM (on system board)
- 5151/5272 Display Adapter
- 5271 Keyboard, Keyboard Adapter, Keyboard Overlay, and Keyboard Cable
- One 360KB Half High Diskette Drive
- 3270 Systems Adapter
- Printer Adapter

| Model 050: (NO LONGER AVAILABLE)

- Same as Mdl 030 plus
- Second 360KB Half High Diskette Drive

| Model 070: (NO LONGER AVAILABLE)

- Same as Mdl 030 plus
- One 20 MB Fixed Disk Drive and Adapter

| Model 031 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- 256 KB Memory (on system board)
- Expanded Memory Adapter (1 MB) incl. Printer Adapter
- 5151/5272 Display Adapter
- 5271 Keyboard, Keyboard Adapter, Keyboard Overlay, and Keyboard Cable
- One 360KB Half High Diskette Drive
- 3270 Systems Adapter

| Model 051 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- Same as Mdl 031 plus
- Second 360KB Half High Diskette Drive

| Model 071 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- Same as Mdl 031 plus
- One 20 MB Fixed Disk Drive

| Model P30 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- Same as Mdl 030 except Enhanced PC Keyboard and cable adapter replace 5271 Keyboard and overlay.

| Model P50 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- Same as Mdl 050 except Enhanced PC Keyboard and cable adapter replace 5271 Keyboard and overlay.

Model P70 (Requires 3270-PC Program 3.0)

- Same as Mdl 070 except Enhanced PC Keyboard and cable adapter replace 5271 Keyboard and overlay.

| Model P31 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- Same as Mdl 031 except Enhanced PC Keyboard and cable adapter replace 5271 Keyboard and overlay.

| Model P51 (Requires 3270-PC Program 3.0): (NO LONGER AVAILABLE)

- Same as Mdl 051 except Enhanced PC Keyboard and cable adapter replace 5271 Keyboard and overlay.

Model P71 (Requires 3270-PC Program 3.0)

- Same as Mdl 071 except Enhanced PC Keyboard and cable adapter replace 5271 Keyboard and overlay.

The 5272 Color Display includes:

Line Cord
Color Display Stand

Customer Setup (CSU): The IBM 3270 Personal Computer and its options are customer setup (CSU). CSU allowance is one day. Detailed set-up instructions are included with each machine and option. Setup service is available from the IBM National Service Division at IBM hourly rates and minimum charges.

The 3270 Personal Computer attaches to one terminal port and may have up to four addresses associated with it in the 3274.

HIGHLIGHTS

- The 5271 attaches to a 3274, 3276, 4321, 4331, 4361 or the 9370 Workstation Subsystem Controller in Control Unit Terminal mode. In Distributed Function Terminal mode, it attaches to a 3274 using one physical port and up to four logical addresses. Up to 32 5271s can be attached to a 3274, depending on the application and the 3274 mdl used. The 5271 attaches via the same type coax cable and shielded twisted cable pair used with other 3270 terminals.
- The 5161 Expansion Unit attaches to the 5271 System Unit (only for Mdls 002, 004, 006, 024, 026). Refer to M5161 pages for additional information.
- The IBM 3295 Plasma Monitor is the only monitor attaching to 5271 Mdls 024, 026. The 3295 attaches only to 5271 Mdls 024, 026. The 3295 is supported only with Version 1.2.2 of the 3270 PC Control Program.

System Units: Some models use half high diskettes allowing 3 file spindles.

Printers:

3852-1 Color Printer
3852-2 Color Jetprinter (Requires 3270 PC Control Program 2.1 or 3.0)

3812 Pageprinter
5182 Color Printer
5201 Quietwriter
5201-2 Quietwriter (Requires 3270 PC Control Program 2.1 or 3.0)

5216 Wheelprinter
5223 Wheelprinter E
4201 Proprietary
5152 Graphics Printer

Consult your IBM Marketing Representative for restrictions on these printers when attached to the 3270 PC.

Plotters: The 6180, 7371, 7372, 7374, and 7375 plotters attach to the 5271 system unit via the asynchronous communications adapter.

The 3270 PC (except mdls 024, 026) supports the Personal Telephone Manager Adapter (P/N 6428982, #8982) and the Personal Telephone Manager Program (Program No. 6429190, #8989) to connect the telephone to the 3270 PC System Unit to significantly enhance telephone communications.

Customer Responsibilities: The customer is responsible for:

- Adequate site, system and other vendor preparations.

- Receipt at customer's receiving dock, unpacking, and placement of the unit.
- Physical setup, connection of cables in customer access areas, switch settings, and checkout.
- Contacting an IBM customer service coordinator for attachment of the 5271 communication cable to an on-site serviced IBM control unit where customer access area is not provided.
- Customizing the 3270 Personal Computer and 3274 (see 3274 Customizing Guide, GA23-0065 and "IBM 3270 PC Introduction and Pre-Installation Planning Guide", GA23-0179).
- Performing Customer Problem Analysis and Resolution (CPAR).
- Testing other IBM Personal Computer options not specifically announced as supported on the 3270 Personal Computer to assure viability. IBM does not assume responsibility for them.
- Determining the required number of spares, including blank diskettes.

The standard models require the following number of slots in the system unit:

Model	# Slots
030, P30	5
050, P50	5
070, P70	6
031, P31	5
051, P51	5
071, P71	6
002	4
004, 024	5
006, 026	6

Performance: When a 3270 Personal Computer is connected to a local channel unit (3274-31A, -31D, 41A, -41D) in Control Unit Terminal mode, an increase in system response time of about 100 ms may be experienced when running base data stream applications when compared with a 3278 Display.

During file transfers in Control Unit Terminal mode, a noticeable impact on the response times of other terminal connected to the same local channel unit may be experienced. The duration of the delays is dependent upon the file size, frequency of transfers, type of control unit or modem, and customer setup. The 3270 PC File Transfer Licensed programs transfer files in 2000-byte blocks to minimize the impact on the network that large file transfers might have.

Publications: Each 5271 shipment to a customer will include the 3270 PC Guide to Operations. The following Personal Computer manuals are orderable:

- Personal Computer Hardware Maintenance and Service (#3087, P/N 6280087)
- DOS 3.2 (#0057, P/N 6280057)
- DOS 3.1 (#4211, P/N 6024211)
- DOS 2.1 (#4120, P/N 6024120)
- BASIC Reference Manual (#1132, P/N 6361132)
- DOS Technical Reference Manual (#4213, P/N 6024213)

TECHNICAL INFORMATION

Hardware Requirements: The 3270 Personal Computer attaches to System/370 processors and processor complexes and 30XX processors via a 3274 or 3276 (Control Unit Terminal mode only), or to a 4361 Workstation Adapter, or the 9370 Workstation Subsystem Controller.

All attachment environments are supported: i.e., SNA local channel, non-SNA local channel, synchronous data link control (SDLC) remote, and binary synchronous control (BSC) remote. Connection to the IBM 3274 Control Unit via a coaxial cable, telephone twisted pair with IBM/ROLM 3270 Coax-to-Twisted Pair Adapter, or IBM Cabling System Media. Attachment to the IBM 3274 Control Unit via the IBM 3299 terminal multiplexer is supported.

The 3270 Personal Computer conforms to FCC class A specifications.

3274 Mdls and Configuration Support: Table A identifies the 3274 mdls and configuration support required for the 3270 PC.

TABLE A. 3274 MDLS AND CONFIGURATION SUPPORT

3274 Mdl/Storage			
1B	1A,C,D	1A,C,D	31A,C,D
21B	21A,C,D	31A,C,D	41A,C,D
	51C	51C	51C
			61C
64K	64K	128K	192K
5271 Mode: Control Unit Terminal			
A	A,B	A,B,C	D
5271 Mode: Control Unit Terminal or Distributed Function Terminal			
			D*

* Configuration Support D must be at release level 64.1 or higher.

The multiple logical terminal facility of the 3270 Personal Computer allows the user to designate up to four terminal addresses in a single 3270 Personal Computer. This requires one physical port in the 3274 Control Unit. When planning installation of the 3270 Personal Computer consideration must be given to the number of logical and physical addresses that are to be used compared to the maximum number of addresses and ports that are available. The number of addresses and ports available is dependent on the model 3274 and the method of system attachment.

When the 3274 has 3270 Personal Computers attached that are operating in Distributed Function Terminal mode, Table B specifies the maximum number of 3270 Personal Computer or other logical terminals that can be attached to the 3274.

TABLE B - MAXIMUM NUMBER LOGICAL TERMINALS ON A 3274

3274 Model	System Attachment	Max. No. Terminals
1A	Channel, SNA	128
1C	TP SDLC	128
	TP BSC	32
1D	Channel, Non-SNA	32
31A	Channel, SNA	128
31C	TP, SDLC	128
	TP, BSC	32
31D	Channel, Non-SNA	32
41A	Channel, SNA	128
41C	TP SDLC	128
	TP BSC	32
41D	Channel, Non-SNA	32
51C	TP SDLC	36
	TP BSC	32
61C	TP SDLC	76
	TP BSC	32

Limitations: The following 3270 capabilities are not available in the 3270 Personal Computer:

- 3270 diagnostic reset dump
- 3274 Entry Assist feature (in DFT mode)
- Base (four-color) color copy to the 3274 attached printer
- Binary Synchronous Copy Command
- Explicit partitions
- Graphics escape
- Katakana
- Keyboard clicker
- Keyboard types
- Magnetic Reader control and accessories
- Monocase switch
- Numeric lock
- RPQs
- Selector light-pen
- Video output

The following capabilities are available only in Control Unit Terminal mode:

- Category "B" terminals (e.g., 3277 Display Stations) used on the same 3274 Control Unit
- 3274 Encryption/decryption

The following RPQs in the 3274 Control Unit are not allowed when a 3270 PC operating in Control Unit Terminal mode is attached; they relate to keyboard changes: 8K0809, 8K0931, 8K0949, 8K0988, 8K1011, 8K1013, 8K1037, 8K1056, 8K1057, 8K1134, 8K1159, 8K1160, 8K1162, 8K1163, 8K1169, 8K1170, 8K1195, 8K1281, 8X0002, 8X0003, 8X0004, 8X0008, 8X0009, 8X0011.

IBM Personal Computer options and programs may be usable, but need to be tested by the user to assure viability.

Software Requirements: The 3270 Personal Computer is data stream compatible with today's IBM 3270 displays in alphanumeric application environments. Existing alphanumeric applications will run on the 3270 Personal Computer unmodified (in their current screen size). No programming changes are required of current alphanumeric applications unless the program is affected by 3274 Control Unit configuration restrictions (e.g., no category "B" terminals) or required hardware functions not available with the 3270 Personal Computer (e.g., light pen, magnetic readers, encryption/decryption, or unsupported screen sizes).

The 3270 Personal Computer will accept base 3270 and 3270 extended data streams. It will support 3270 PC File Transfer. In Distributed Function Terminal mode, 3270 Extended Data Stream can be used to support extended highlighting and color.

Warranty Service: IBM On-Site Repair (IOR) service is provided during the warranty period. IBM On-Site Repair is described under the terms and conditions of the Agreement for Purchase of IBM Machines (Z120-2892).

Warranty Period: Three months for all models of the 3270 PC (5271) and all optional features used only on the 5271. One year for the Expanded Memory adapter and the Expanded Memory 1MB Module Kit. During the warranty period, warranty periods for optional features which are less than 12 months will be extended to coincide with the expiration of the 3270 PC warranty. Optional features which are installed subsequent to the 3270 PC installation, such that their warranty period extends beyond that of the 3270 PC, will assume their normal warranty. If the warranty period of the feature is different from that of the system unit, the customer may be required to provide proof of purchase to receive warranty service on the feature.

Maintenance Service: Is available under the IBM Maintenance Agreement (Z125-3275). The following services as described in the "Information Bulletin for Customers - IBM Service/Exchange Center Services" are available:

Customer Carry-In Repair (CCR) #9821
 IBM On-Site Repair (IOR) #9798

The 5271 maintenance and warranty option charges do not include the Fixed Disk Drive when installed as an option.

The maintenance and warranty option charges for the Standard 5271 Mdl's include the respective Fixed Disk Drive and Diskette Drive(s).

All other announced features are included in the system unit. Hourly Service Rate Class 2 applies.

The Machine Group Identification is A.

SPECIFY

- Power (100-127V or 200-240V AC, 1-phase, 3-wire, 50/60 Hz).

- Line Cord:

Item No.	Country
5640664	Australia, New Zealand
5641389	Hong Kong
5640663	Indonesia
5640662	Malaysia, Singapore

- 5271 Keyboard:

Language	Item No.
English US	6110344
Spanish	1445097

- Keyboard Overlay:

Language	Item No.
English US	1837469
Spanish	6018064

SPECIAL FEATURES

The Special Features and PC-XT options listed below may be ordered with the 5271 and will be set-up in the 5271 prior to delivery, except where indicated as field install only. They may also be set-up in the field by the customer. When ordering for installed systems process as a feature code of the special ordering vehicle 5271-ZZZ.

Although the Half High Diskette Drive and the 20MB Fixed Disk Drive and Adapter are 5160 PC options that may be ordered with the 5271, it is expected that new orders will be placed for the appropriate configurations.

Expanded Memory Adapter (XMA) (#3350): The Expanded Memory Adapter (XMA) uses a full length card slot and contains 1MB of memory and a standard parallel printer port.

When the XMA is installed, the 5271 system memory must be configured to 256KB. The XMA then provides multiple banks of dynamically switchable memory which are addressed as the 256 to 640 KB space. The application banks may vary in size from 4KB up to 384 KB in 4KB increments with one application permitted a maximum of 512KB. (The maximum is variable depending on whether device drivers or system extensions are loaded with the 3270 PC Control Program.)

A maximum of six local applications may be configured. These reside in the XMA card memory (except for a portion of a single application which may exceed 384KB.) Part of the 3270 PC Control Program (maximum 384KB) is also stored in the XMA card memory.

The XMA is standard in 5271-031, P31, 051, P51, 071 and P71. The XMA is optional (one, field install only) in 5271-030, P30, 050, P50, 070 and P70 and 5271-002, 004 and 006. Field Installation: Yes. Limitations: Cannot be used in 5271-024 and 026. Must be used with 3270 PC Control Program Version 3.0.

Expanded Memory 1 MB Module Kit (#3360): This feature provides a kit of memory modules to plug on the Expanded Memory Adapter. The Kit contains 1 MB and becomes the 2nd MB of memory used by the Expanded Memory Adapter. The Kit is optional (one) in any

system unit using the Expanded Memory Adapter. Field Installation: Yes.

2MB Expanded Memory Adapter (#3910): Provides 2MB of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30 (8530). The 2MB Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICRO-SOFT.

The 2MB Expanded Memory Adapter may be installed in any full length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT or Personal System/2 Model 30. However, a double socketed (16-bit) bus slot is recommended for the Personal Computer At and 3270 Personal Computer AT to enable the 2MB Expanded Memory Adapter to achieve optimum performance.

The 2MB Expanded Memory Adapter will backfill conventional memory from the 256KB address to the 640KB address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to two PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2MB Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16KB increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2MB) through four 16KB pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: One 2MB Expanded Memory Adapter. Field Installation: Yes.

256KB Memory Expansion (#4500): Provides an additional 256KB memory for the 5271 system unit. Plugs into #4505. Maximum: One. Field Installation: Yes. Prerequisites: #4505. Limitations: For Mdl's 002, 004, 006, 024, 026 only.

Printer/Memory Adapter (#4505): Provides the capability to attach selected printers to the 5271 System Unit as well as providing 128KB memory. Maximum: One. The Printer Cable #5612 must be ordered to attach the printer to the System Unit. Field Installation: Yes. Limitations: Mdl's 2 only. (Standard on Mdl's 004, 006, 024, 026)

All-Points-Addressable (#4910): Provides the storage and controls necessary for displaying local graphics in either high- or medium-resolution mode. Medium-resolution mode is available with a choice of two sets of four colors at 360 x 350, or 320 x 200 pels. Maximum: One. Field Installation: Yes. Prerequisites: An available system expansion slot adjacent to the Display Adapter Card. Limitations: Not for Mdl's 024, 026. Since the aspect ratio differs for each display monitor, BASIC or other application programs must control the aspect ratio parameter, (i.e., a circle on the 5150 PC with the Color/Graphics adapter will look somewhat elliptical on the 3270-PC with the APA adapter unless this parameter is changed.)

Programmed Symbols (#5790): Provides storage for up to six 190 symbol sets whose shapes and codes are customer-definable. Symbol sets are loaded (and accessed for display) under program control. Maximum: One. Field Installation: Yes. Prerequisites: An available system expansion slot, adjacent to the Display Adapter. Limitations: Not for Mdl's 024, 026. Available in Distributed Function (DFT) terminal mode only. May be used in only one of the four host sessions.

PC-XT Options:

Math Co-Processor (#1002): This option is a high-performance numeric 8087 processor extension with the floating point, extended integer, and BCD data types, compatible with the INTEL 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Only one 8087 can be

installed in a system unit. For any 5271 model except 024, 026. Field Installation: Yes.

360KB Half High Diskette Drive (#3325): This is a half high 5-1/4 inch, dual sided diskette drive with 360KB storage capacity. The drive is fully self contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system. (One drive is optional in Mdls x3x, x7x as the second diskette drive. (One is standard in Mdls x3x, x7x and two are standard in Mdl x5x.) Limitations: Only for Mdls x3x (field install only) and x7x, with a maximum of two drives (including standard and optional) in a system unit. Field Installation: Yes.

The 5271 System Unit is capable of supporting other 5160 PC options. Expansion slots must be available to attach these options.

Note: Slots 1 through 6 are long slots, 7 and 8 are short.

The following 5160 PC options may be ordered with the 3270 PC:

- Communications Adapter Cable (#2067)
- Asynchronous Communications Adapter (#2074)
- 10MB Fixed Disk (#2500) (Mdl 002 only)
- Fixed Disk Adapter (#2501) (Mdl 002 only)
- Dual-Sided Diskette Drive (#3810) (Mdl 002 only)
- High Speed Adapter (#4920)
- 3117 Adapter (#4925)
- Printer Adapter (#5200)
- Printer Cable (#5612)

20 MB Fixed Disk Drive (#3326): One drive is standard in Mdl x7x, one is optional in Mdls x3x, x5x; providing a maximum of 20MB of fixed disk storage. Prerequisites: 20MB Fixed Disk Adapter (P/N 6450324). Limitations: Available only for field install in Mdls x3x, x5x. Only one fixed disk drive may be installed in a system unit. Field Installation: Yes. Limitations: For Mdls x3x, x5x and x7x only.

20 MB Fixed Drive Adapter (#3327): This adapter requires one full card slot and is a prerequisite for the 20MB Fixed Disk Drive. The adapter is standard in Mdl x7x and one is optional in Mdls x3x, x5x. Field Installation: Yes.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the 3270 Personal Computer with a network adapter to the IBM Cabling System or directly to an access unit.

Note: This feature does not apply to 5271 Mdls 024 and 026.

IBM Token-Ring Network PC Adapter (#3391) or PC Adapter II (#5063): Allows the 3270 Personal Computer and 3270 Personal Computer AT to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter diagnostics and ring diagnostics, and the adapter handler programming interface.

3270-PC installation instructions for these adapters, and all the appropriate software, can be found in the "IBM Token-Ring Network

NETBIOS Version 1.1 Users Guide", which also contains a supplement to the "IBM Token-Ring Network PC Adapter, or PC Adapter II, Guide to Operations." Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a Type 3 Media Filter (available from IBM Cabling System distributors) for attaching to IBM Cabling System Type 3 specified telephone media.

The IBM Token-Ring Network NETBIOS Version 1.1 and the 802.2 Data Link Control Programming Interface contained in the IBM Token-Ring Network Adapter Support Program for the 3270-PC, which is included in the IBM Token-Ring Network NETBIOS Version 1.1 program package, are required to install the PC Adapters into the 3270-PC. This software permits customers to write/operate applications on the 3270-PC to the NETBIOS interface on the IBM Token-Ring Network.

A PRPQ, called IBM Token-Ring Network Adapter Support Program for the 3270-PC, will be offered in January 87, for those customers wishing to write/operate applications to the 802.2 Data Link Control Programming Interface. Limitations: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

Note: This feature does not apply to 5271 Mdls 024 and 026.

Personal Telephone Manager Adapter (#8982): Provides a telephone channel allowing the connection of the telephone to the 3270 Personal Computer for utilization of advanced telephone function. The Personal Telephone Manager Program (P/N 6429190, Feature #8989 of 5870-LLA) will provide advanced telephone applications. Refer to Programming Announcement 285-408 dated October 15, 1985 and Product Announcement 185-129 dated October 15, 1985. The user can obtain the Technical Reference Manual (SX27-3657) after December 30, 1985, which provides adapter interface information for writing application software to enhance telephone applications. The "Personal Telephone Manager Hardware Maintenance & Service Assembly" may be obtained by ordering Form SX27-3656. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot, analog telephone (pulse or tone) and cord with modular plug, standard analog USOC RJ11C/W, RJ12C/W, RJ13C/W wall connector, or IBM Token-Ring Network wall connector. Customer Setup: Yes. Limitations: This feature is U.S. only.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5272 COLOR DISPLAY**PURPOSE**

A 14-inch color cathode-ray tube (CRT) used with the 5271 System Unit for displaying data to the professional user. A tilt and rotate mechanism is included in the 5272 Color Display Stand.

MODELS**Model 001**

Prerequisites: 5271 System Unit.

Customer Setup: Yes. IBM setup is available at IBM hourly rates and minimum charges.

HIGHLIGHTS

Displays 720 by 350 picture elements which in host-interactive mode provides a 1,920-character screen of 80 characters by 24 lines. A 25th line is available for an operator information area. When the 5271 operates in 3270 PC stand-alone mode, 2,000 characters are displayed as 80 characters by 25 lines. The character cell is 9x14.

Customer Responsibilities: The customer is responsible for:

- Adequate Site, system, and other vendor preparation.
- Receipt at customer's receiving dock, unpacking and placement of the unit.
- Physical setup, connection of cables, switch settings, and checkout.
- Determination of the required number of spares.
- Performing customer problem analysis and resolution.
- Calling a toll-free number for service.

Bibliography: See *KWIC Index* or specific system bibliography.

SPECIFY

- Power (100-127V AC, 1-phase, 3-wire, 50/60 Hz or 200-240V AC, 1-phase, 3-wire, 50/60 Hz): No specify required.
- Line Cord: Specify one. Provides input power to the 5272 Color Display.

Item No.	Country
6952311	Australia, New Zealand
6952356	Hong Kong
6952320	Indonesia
6952356	Malaysia, Singapore

- 5272 Color Display Stand (P/N 6871672): Provides a base for the 5272 Color Display and allows +/- 50 degrees of swivel and +15/-4 degrees of tilt (no specify required). **Customer Setup:** Yes.

SPECIAL FEATURES (None)**MODEL CONVERSIONS (None)****ACCESSORIES (None)****SUPPLIES (None)**

5273 SYSTEM UNIT

PURPOSE

The 3270 Personal Computer AT System Unit operates with the 3270 PC Control Program Version 2.1 (P/N 6217355) or 3.0 (59X9968) and IBM PC DOS Version 3.1 or 3.2 to combine the host-interactive functions of the 3270 Information Display System and the computing power and versatility of the IBM Personal Computer AT. The 3270 Personal Computer AT can operate with four 3270 type sessions, two local notepad sessions, and up to six IBM PC DOS sessions. The 3270 Personal Computer AT provides for the attachment of a 5271 Keyboard or a PC Enhanced Keyboard and a display unit. The display may be a 5151 Monochrome Display or a 5272 Color Display. The 3270 Personal Computer AT System Unit attaches to a 3274 Control Unit or 3276 Control Unit Display Station as a category 'A' terminal.

The 3270 Personal Computer AT is available in several configurations consisting of:

- 5273 System Units
- 5151 Monochrome or 5272 Color Display
- Selected Printer (optional)
- Selected Scanner (optional)

The 3270 Personal Computer AT System Units are orderable as standard models. Each includes a power cord and the Guide to Operations. The 3270 Personal Computer AT Hardware Maintenance and Service Manual is separately orderable from Mechanicsburg as a supplement to the IBM Personal Computer Hardware Maintenance and Service Manual. A "Hardware Maintenance and Service Summary" card (SX23-0367) is included in the Guide to Operations.

MODELS

The standard models include the above items plus the following:

Model 020 (NO LONGER AVAILABLE)

- 512 KB RAM
- 5151/5272 Display Adapter
- 5271 Keyboard, Keyboard adapter, Keyboard Overlay, and Keyboard Cable
- One 1.2 MB diskette drive
- 3270 Systems Adapter
- Serial/Parallel adapter

Model 041 (NO LONGER AVAILABLE)

- 640 KB RAM
- 5151/5272 Display Adapter
- 5271 Keyboard, Keyboard adapter, Keyboard Overlay, and Keyboard Cable
- Two 1.2 MB diskette drives
- 3270 Systems Adapter
- Serial/Parallel adapter

Model 042 (NO LONGER AVAILABLE): Same as Model 041 plus

- Extended Graphics Adapter (XGA)

Model 061 (NO LONGER AVAILABLE)

- 640 KB RAM
- 5151/5272 Display Adapter
- 5271 Keyboard, Keyboard adapter, Keyboard Overlay, and Keyboard Cable
- One 1.2 MB diskette drive
- One 20 MB Fixed disk drive
- 3270 Systems Adapter
- Serial/Parallel adapter

Model 062 (NO LONGER AVAILABLE): Same as Model 061 plus

- Extended Graphics Adapter (XGA)

Model 070 (Requires 3270 PC Program 3.0) (NO LONGER AVAILABLE)

- 640 KB RAM (512 KB on System board plus 128 KB card)
- 5151/5272 Display Adapter
- 5271 Keyboard, Keyboard Adapter, Keyboard Overlay, and Keyboard Cable
- One 1.2 MB diskette drive
- 3270 Systems Adapter
- One 30MB Fixed Disk Drive
- Serial/Parallel Adapter

Model 071 (Requires 3270 PC Program 3.0) (NO LONGER AVAILABLE)

- 512 KB Memory (on system board, configured as 256KB)
- Expanded Memory Adapter (1 MB) incl. Printer Adapter
- 5151/5272 Display Adapter
- 3270 PC Keyboard, Keyboard Adapter, Keyboard Overlay, and Keyboard Cable
- One 1.2MB Diskette Drive
- One 30 MB Fixed Disk Drive
- 3270 Systems Adapter

Model P71 (Requires 3270 PC Program 3.0)

- Same as Model 071 except Enhanced PC Keyboard and cable adapter replaces 3270 PC Keyboard and overlay.

Model P70 (Requires 3270 PC Program 3.0)

- Same as Model 070 except Enhanced PC Keyboard and cable adapter replaces 3270 PC Keyboard and overlay.

The 5272 Color Display includes:

- Line cord
- Color display stand

Customer Setup (CSU): The 3270 Personal Computer AT and its options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each machine and option. Setup service is available from the IBM National Service Division at IBM hourly rates and minimum charges.

HIGHLIGHTS

Display Monitors:

- 5151 Monochrome Display
- 5272 Color Monitor

Printers:

- 3812 Pageprinter
- 3852-1 Color Printer
- 3852-2 Color Jetprinter
- 4201 Proprinter
- 5152 Graphics Printer
- 5182 Color Printer
- 5201 Quietwriter
- 5201-2 Quietwriter
- 5216 Wheelprinter
- 5223 Wheelprinter E

Consult your IBM Marketing Representative for restrictions on these printers when attached to the 3270 Personal Computer AT.

Scanners:

- 3117 Scanner
- 3118 Scanner

Consult your IBM Marketing Representative for restrictions on these scanners when attached to the 3270-PC.

Plotters:

- The 6180, 7372, 7374 and 7375 plotters attach to the 5273 system unit via the asynchronous communication adapter.

System Units:

- Expanded Memory Adapter as Standard Models and Optional Adapters.
- Enhanced PC Keyboard is optionally available in place of the 3270 PC Keyboard.
- 8 MHZ microprocessor for Mdl 070, P70, 071, P71.
- 6 MHZ microprocessor for Mdl 020, 041, 042, 061, 062.

The 5273 supports the Personal Telephone Manager Adapter (P/N 6428982, #8982) and the Personal Telephone Manager Program (P/N 6429190, #8989) to connect the telephone to the 5273 System Unit to significantly enhance telephone communications.

Customer Responsibilities: The customer is responsible for:

- Adequate site, system, and other vendor preparation
- Receipt at customer's receiving dock, unpacking, and placement of the unit
- Physical setup, connection of cables in customer access areas, switch settings, and checkout
- Contacting an IBM customer service coordinator for attachment of the 5273 communication cable to an on-site serviced IBM control unit where customer access area is not provided
- Customizing the 3270 PC Control Program and 3274 (see "3274 Customizing Guide", GA23-0065)
- Performing Customer Problem Analysis and Resolution (CPAR)
- Testing other IBM PC options not specifically announced as supported on the 3270 PC-AT to assure viability.

The standard models require the following number of slots in the system unit:

Model	Number of Slots
071, P71	5
070, P70	6
020	5
041, 061	6
042, 062	7

Performance: When a 3270 Personal Computer AT is connected to a local channel unit (3274-31A, -31D, -41A, -41D) in Control Unit Terminal mode, an increase in system response time of about 100 ms, compared with a 3278 Display, may be experienced when running base data stream applications.

During file transfers in Control Unit Terminal mode, a noticeable impact on the response time of other terminals connected to the same local channel control unit may be experienced. The duration of the delays is dependent upon the file size, frequency of transfers, type of control unit or modem, and customer setup. The 3270 PC File Transfer licensed programs transfer files in 2000-byte blocks to minimize the impact on the network that large file transfers might have.

Limitations: The following 3270 capabilities are not available in the 3270 Personal Computer AT:

- 3270 diagnostic reset dump
- 3274 Entry Assist feature (in DFT mode)
- Base (four-color) color copy to the 3274 attached printer
- Binary Synchronous Copy Command
- Explicit partitions
- Graphics escape
- Katakana
- Keyboard clicker
- Keyboard types

- Magnetic Reader control and accessories
- Monocase switch
- Numeric lock
- RPQs
- Selector light-pen
- Video output

The following capabilities are available only in Control Unit Terminal mode:

- Category "B" terminals (e.g., 3277 Display Stations) used on the same 3274 Control Unit
- 3274 Encryption/decryption

The following RPQs in the 3274 Control Unit are not allowed when a 3270 Personal Computer AT operating in Control Unit Terminal mode is attached; they relate to keyboard changes: 8K0809, 8K0931, 8K0949, 8K0988, 8K1011, 8K1012, 8K1013, 8K1037, 8K1056, 8K1057, 8K1134, 8K1159, 8K1160, 8K1162, 8K1163, 8K1169, 8K1170, 8K1195, 8K1281, 8X0002, 8X0003, 8X0004, 8X0008, 8X0009, 8X0011.

IBM Personal Computer options and programs may be usable, but need to be tested by the user to assure viability.

Publications: The following Personal Computer AT manuals are orderable:

- Personal Computer Hardware Maintenance and Service Manual (#3087, P/N 6280087)
- BASIC Reference Manual (#1132, P/N 6361132)
- DOS 3.1 (#4211, P/N 6024211)
- DOS 3.2 (#0057, P/N 6280057)
- DOS Technical Reference Manual (#4213, P/N 6024213)
- IBM 3270 Personal Computer AT Hardware Maintenance and Service Manual, SY27-2581 (for mdls 070, P70, 071, P71), Feature #3370
- IBM 3270 Personal Computer AT Hardware Maintenance & Service Manual, SY27-2577 (for mdls 020, 041, 042, 061, 062 only), Feature #6005

TECHNICAL INFORMATION

Hardware Requirements: The 3270 Personal Computer AT attaches to System/370 processors and processor complexes and 30xx processors via a 3274 or 3276 (Control Unit Terminal mode only), or a 4361 Workstation Adapter.

All attachment environments are supported: (i.e., SNA local channel, non-SNA local channel, synchronous data link control (SDLC) remote, and binary synchronous control (BSC) remote). Connection to the IBM 3274 Control Unit is via co-axial cable, telephone twisted pair with IBM/ROLM 3270 Coax-to-Twisted Pair Adapter, or IBM Cabling System Media. Attachment to the 3274 Control Unit via the IBM 3299 terminal multiplexer is supported.

The 3270 Personal Computer AT conforms to FCC class A specifications.

3274 MODELS AND CONFIGURATION SUPPORT

The following table identifies the 3274 models and configuration support required for the 3270 Personal Computer AT.

3274 model:	1B	1A,C,D	1A,C,D	31A,C,D
	21B	21A,C,D	31A,C,D	41A,C,D
Storage		51C	51C	51C,61C
	64K	64K	128K	192K

5273 Modes

Control Unit Terminal Mode	A	A,B	A,B,C	D
----------------------------	---	-----	-------	---

Control Unit Terminal or

Distributed Function Terminal Mode

D*

* Configuration support D must be at release level 64.1 or higher.

The multiple logical terminal facility of the 3270 Personal Computer AT allows the user to designate up to four terminal addresses in a single 3270 Personal Computer AT. This requires one physical port in the 3274 Control Unit. When planning installation of the 3270 Personal Computer AT, consideration must be given to the number of logical and physical addresses that are to be used compared to the maximum number of addresses and ports that are available. The number of addresses and ports available is dependent on the 3274 model installed/used and the method of system attachment.

When the 3274 has 3270 Personal Computer ATs attached that are operating in Distributed Function Terminal mode, the following Table specifies the maximum number of 3270 Personal Computer AT or other logical terminals that can be attached to the 3274.

3274 Model	System Attachment	Max. No. Terminals
1A	Channel, SNA	128
1C	TP, SDLC	128
	TP, BSC	32
1D	Channel, Non-SNA	32
31A	Channel, SNA	128
31C	TP, SDLC	128
	TP, BSC	32
31D	Channel, Non-SNA	32
41A	Channel, SNA	128
41C	TP, SDLC	128
	TP, BSC	32
41D	Channel, Non-SNA	32
51C	TP, SDLC	36
	TP, BSC	32
61C	TP, SDLC	76
	TP, BSC	32

Category "B" terminal restrictions: Category "B" terminals (e.g., 3277 Display Stations) cannot be used on the same 3274 when the 3274 is customized to support 3270 Personal Computer ATs operating in Distributed Function Terminal mode.

The 3274 attached printers support the 3270 Personal Computer AT with local copy print capability. Host-initiated copy is in either SNA or non-SNA mode.

The SNA Character String (SCS) requires specify code #9660 in the 3287.

Software Requirements: The 3270 Personal Computer AT is data stream compatible with today's 3270 displays in alphameric application environments. Existing alphameric applications will run on the 3270 Personal Computer AT unmodified (in their current screen size). No programming changes are required of current alphameric applications unless the program is affected by 3274 Control Unit configuration restrictions (e.g., no category 'B' terminals) or required hardware functions not available with the 3270 Personal Computer AT (e.g., light pen, magnetic readers, encryption/decryption, or unsupported screen sizes).

The 3270 Personal Computer AT will accept base 3270 and 3270 extended data streams. It will support 3270 PC File Transfer. In Distributed Function Terminal mode, 3270 Extended Data Stream can be used to support extended highlighting and color.

Warranty Period: One year for the 3270 Personal Computer AT and all its options. During the warranty period, warranty periods for optional features that are less than 12 months will be extended to coincide with the expiration of the 3270 Personal Computer AT warranty. Optional features which are installed subsequent to the 3270 Personal Computer AT installation, such that their warranty period extends beyond that of the 3270 Personal Computer AT, will assume their normal warranty. If the warranty period of the feature is dif-

ferent from that of the system unit, the customer may be required to provide proof of purchase to receive warranty service on the feature.

Maintenance Service: The 3270 Personal Computer AT maintenance and warranty option charges do not include the Fixed Disk Drive when installed as an option. The maintenance and warranty option charges for the Standard 3270 Personal Computer AT Models include the respective Fixed Disk Drive and/or Diskette Drive(s). All other announced features are included in the system unit maintenance charge. The customer must ensure that the system unit is unlocked when presented for service.

- ISM/ISAM Branch Offices
- Volume Orders under the IBM Volume Workstation Agreement
- Single Orders under the IBM Purchase Agreement
- IBM Product Centers
- IBM Direct
- Reseller Channels:
 - Authorized IBM PC Dealers
 - Authorized IBM Resellers
 - Agents

Warranty: 12 Months.

If purchased under the IBM Purchase Agreement, the IBM Service/Exchange Center Amendment applies. All service options announced as available under the Maintenance Agreement (see paragraph Maintenance Offerings) are available at customer discretion and without additional charge during the warranty period.

If purchased through IBM Product Centers, or through IBM Direct or Remarketer Channels, the warranty provisions as stated in the respective agreements apply.

Maintenance Offerings: IBM offers maintenance services under the following terms and conditions:

- The "IBM Maintenance Agreement" in conjunction with the "IBM Service/Exchange Repair Center Amendment".
- The maintenance options below are offered: (Note: The availability of these offerings may vary by countries)
- Customer Carry-In/Mail-In Repair.
 - Customer Carry-In/Mail-In Exchange.
 - Courier Service.
 - IBM On-Site Service.

Maintenance Services under these options are available during the normal IBM business hours and no optional periods of maintenance service are offered.

The maintenance charges will be billed annually.

- Time and Material: The repair of defective elements not covered by warranty or a maintenance agreement is only provided at the IBM Repair Center on a time and materials basis.

On-site Assistance: On customer request, IBM will provide on-site assistance to perform Customer Problem Analysis and Resolution (CPAR). IBM will use the same documentation that is available to the customer. This service is provided on an hourly service basis at the applicable hourly rates and terms and conditions.

SPECIFY (NONE)

SPECIAL FEATURES

Special Feature and PC-AT options listed below may be ordered with the 5273 and will be set-up in the 5273 prior to delivery, except where indicated as field install only. They may also be set-up in the

field by the customer. When ordering for installed systems process as a feature code of the special ordering vehicle 5273-ZZZ.

Extended Graphics Adapter (XGA): This adapter provides the storage and controls necessary for displaying local graphics in either high or medium-resolution mode. High-resolution mode is available in two colors at 720 x 350, or 640 x 200 pels. Medium-resolution mode is available with a choice of two sets of four colors at 360 x 350, or 320 x 200 pels. This feature is standard on 5273 Mdls 042, 062 and optional on all other 5273 models. Maximum: One. Field Installation: Yes. Prerequisites: An available system expansion slot adjacent to the display adapter card. If a PS feature is installed next to the display adapter, the slot adjacent to the PS feature must be used.

Since the aspect ratio differs for each display monitor, BASIC or other application programs must control the aspect ratio parameter, (i.e., a circle on the 5150/5160 PC with the Color/Graphics adapter will look somewhat elliptical on the 3270 Personal Computer AT with the XGA adapter unless this parameter is changed).

#4911 should be used to order an XGA feature if:

PS feature has not previously been installed in the System Unit, OR

PS feature is concurrently ordered.

#4912 should be used to order an XGA feature if: PS feature HAS previously been installed in the System Unit.

Programmed Symbols (PS): This feature provides storage for up to six 190 symbol sets whose shapes and codes are customer definable. Symbol sets are loaded (and accessed for display) under program control. GDDM may require APAR PP33127. Maximum: One. Field Installation: Yes. Prerequisites: An available system expansion slot, adjacent to the Display Adapter. If an XGA feature is installed, the slot adjacent to the XGA feature must be used. Limitations: Available in Distributed Function Terminal mode only. May be used in only one of the four host sessions. The Display Adapter is installed in slot 1. The PS card must be installed next to it or the XGA card.

#5791 should be used to order a PS feature if: An XGA feature HAS NOT previously been installed in the system unit, AND an XGA feature is NOT CONCURRENTLY ordered.

#5792 should be used to order a PS feature if:

An XGA feature HAS previously been installed in the system unit, OR

An XGA feature is CONCURRENTLY ordered.

Use the following chart for selecting XGA and PS feature numbers.

XGA

IF	PS is ordered with XGA	No PS is ordered or installed	PS has been previously installed
----	------------------------	-------------------------------	----------------------------------

Then order

XGA-	#4911	#4911	#4912
------	-------	-------	-------

PS

IF	XGA is ordered with PS	No XGA is ordered or installed	XGA has been previously installed
----	------------------------	--------------------------------	-----------------------------------

Then order

PS-	#5792	#5791	#5792
-----	-------	-------	-------

Expanded Memory Adapter (XMA) (#3355): The Expanded Memory Adapter (XMA) uses a single full length card slot and contains 1MB of memory and a standard parallel printer port. (It requires a double socketed slot in the 5273 unit.) When the XMA is installed, the 5273 system memory must be configured to 256KB. The XMA then provides multiple banks of dynamically switchable memory which are addressed as the 256 to 640 KB space. The application banks may vary in size from 4KB up to 384KB in 4KB increments with one application permitted a maximum of 512KB. (The maximum is variable depending on whether device drivers or system extensions are loaded with the 3270-PC Control Program.)

A maximum of six local applications may be configured. These reside in the XMA card memory (except for a portion of a single application which may exceed 384KB.) Part of the 3270 PC Control Program (max. 384KB) is also stored in the XMA card memory. The XMA is standard in 5273-071 and P71. The XMA (#3355) is optional (one; field installation only) in 5273-070, P70, and 5273-020, 041, 042, 061 and 062. Field Installation: Yes. Limitations: Must be used with 3270-PC Control Program Version 3.0.

Expanded Memory 1 MB Module Kit (#3360): This feature provides a kit of memory modules to plug on the Expanded Memory Adapter. The kit contains 1MB and becomes the 2nd MB of memory used by the Expanded Memory Adapter. The Kit is optional (one) in any system unit using the Expanded Memory Adapter. Field Installation: Yes.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the 3270 Personal Computer with a network adapter to the IBM Cabling System or directly to an access unit.

IBM Token-Ring Network PC Adapter (#3391) or PC Adapter II (#5063): Allows the 3270 Personal Computer and 3270 Personal Computer AT to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette, and supporting documentation. The diskette includes adapter diagnostics and ring diagnostics, and the adapter handler programming interface.

3270-PC installation instructions for these adapters, and all the appropriate software, can be found in the "IBM Token-Ring Network NETBIOS Version 1.1 Users Guide", which also contains a supplement to the "IBM Token-Ring Network PC Adapter, or PC Adapter II, Guide to Operations." Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a Type 3 Media Filter (available from IBM Cabling System distributors) for attaching to IBM Cabling System Type 3 specified telephone media.

The IBM Token-Ring Network NETBIOS Version 1.1 and the 802.2 Data Link Control Programming Interface contained in the IBM Token-Ring Network Adapter Support Program for the 3270-PC, which is included in the IBM Token-Ring Network NETBIOS Version 1.1 program package, are required to install the PC Adapters into the 3270-PC. This software permits customers to write/operate applications on the 3270-PC to the NETBIOS interface on the IBM Token-Ring Network.

A PRPO, called IBM Token-Ring Network Adapter Support Program for the 3270-PC, will be offered in January 87, for those customers wishing to write/operate applications to the 802.2 Data Link Control Programming Interface. Limitations: The adapter must be installed in the system unit, and cannot be installed in the 5161 Expansion Unit.

2MB Expanded Memory Adapter (#3910): Provides 2MB of Expanded Memory function and a Standard Parallel Printer Port for the Personal Computer XT (5160), Personal Computer AT, 3270 Personal Computer, 3270 Personal Computer AT and Personal System/2 Model 30. The 2MB Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICRO-SOFT.

The 2MB Expanded Memory Adapter may be installed in any full length slot of a Personal Computer XT, Personal Computer AT, 3270 Personal Computer, 3270 AT or Personal System/2 Model 30. How-

ever, a double socketed (16-bit) busslot is recommended for the Personal Computer At and 3270 Personal Computer AT to enable the 2MB Expanded Memory Adapter to achieve optimum performance.

The 2MB Expanded Memory Adapter will backfill conventional memory from the 256KB address to the 640KB address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to two PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2MB Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16KB increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2MB) through four 16KB pages within the IBM Personal Computer address space. Customer Setup: Yes. Limitations: One 2MB Expanded Memory Adapter. Field Installation: Yes.

PC AT FEATURES

20MB Fixed Disk Drive (#0205): Two optional fixed disk drives may be installed on Model 020 and one on Models 041 and 042, or one, as a second fixed disk drive, on Models 061, 062, 070, 071, P71. Space and power are provided in the system unit for these drives. All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. Increased performance of 40 ms average access time is possible from the quasi-closed loop servo positioning system utilized in the drive. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed drives can be installed in a system unit. Field Installation: Yes. Limitations: Only field installation is provided for 5273 mdl 020.

Characteristics:

- 20 MB of storage
- 512 bytes per sector
- 17 sectors per track
- 615 tracks per surface (cylinders)
- 40 ms average access time
- Four surfaces
- 3573 RPM
- 5M bps data transfer rate
- Dimensions:
 - Height - 82.55mm (3.25 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 2.9 Kg (6.4 lbs.)

High Capacity Diskette Drive (#0206): This is a half-high, 5-1/4 inch, dual-sided drive with 1.2 MB storage capacity. The drive is fully self-contained and consists of a spindle drive system, a read positioning system and a read/write/erase system.

One drive is standard in all 5273 models, two are standard in 5273 mdls 041, 042. An optional second drive (#0206) may be installed in the system unit directly under the first if the space is not occupied by another diskette drive. Both drives use the standard fixed disk or diskette drive adapter in the system unit.

The drive uses the new 96-TPI, high-density media. In addition, it will read or write 48-TPI, single or dual-sided media written for the IBM PCjr, IBM PC, IBM PC-XT, 3270 PC, and IBM Portable Personal Computer, thus giving it a high level of compatibility with existing applications. However, once the 48-TPI media has been written in this drive, it may only be readable on a high-capacity diskette drive. Field Installation: Yes.

Characteristics:

- 1.2 MB storage
- 512 bytes per sector
- 15 sectors per track

- 96 tracks per inch
- 80 tracks per side
- 94 ms average access time in 96-TPI mode
- Two sides
- 360 RPM
- 300 and 500 bps data transfer rate
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 1.6 Kg (3.5 lbs.)

Dual-sided Diskette Drive (#0207): This diskette drive permits the exchange of 320/360 KB diskette media between the 5273 and 5271, IBM PC-AT, IBM PC, IBM PC-XT, IBM Portable PC, and IBM PCjr. It is a half-high, 5-1/4 inch, dual-sided drive with a 320/360KB storage capacity. The drive is fully self-contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system.

This drive is available for all 5273 models. It is installed in the system unit directly under the standard high-capacity diskette drive as drive 'B' if the space is not occupied by another diskette drive. This drive uses the standard fixed disk and diskette drive adapter in the system unit. Field Installation: Yes.

Characteristics:

- 320/360 KB storage
- 512 bytes per sector
- 8/9 sectors per track
- 48 tracks per inch
- 40 tracks per surface
- 91 ms average access time
- Two sides
- 300 RPM
- 250K bps data transfer rate
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)
 - Weight - 1.6 Kg (3.5 lbs.)

128KB Memory Expansion Option (#0209): This option expands the memory from 512 KB to 640 KB. Performance characteristics are the same as other 5170 user memory. Only one 128 KB Memory Expansion Option may be installed on a 512 KB system unit and it requires a 16-bit expansion slot. Field Installation: Yes. Limitations: Not usable on 5273-071, P71.

30 MB Fixed Disk Drive (#0210): One optional fixed disk drive may be installed as a second fixed disk drive on models 070, P70, 071, P71, providing a maximum of 60Mb of fixed disk storage capacity. Space and power are provided in the system unit for this drive(s). All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. Increased performance of 40 ms average access time is possible from the quasi-closed loop servo positioning system utilized in the drive. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed drives can be installed in a system unit. Field Installation: Yes. Limitation: Can not be used on 5273 Models 020, 041, 042, 061, 062.

Characteristics:

- 30 MB of storage
- 512 bytes per sector
- 17 sectors per track
- 615 tracks per surface (cylinders)
- 40 ms average access time
- 5M bit per second transfer rate
- Dimensions:
 - Height - 82.55mm (3.25 in.)
 - Width - 154.3mm (6.1 in.)
 - Depth - 203.2mm (8.0 in.)

Math Co-processor (#0211): This option is a high performance numeric 80287 processor extension with floating point, extended inte-

ger, and BCD data types, compatible with the Intel 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Only one 80287 can be installed in a system unit. Field Installation: Yes.

Serial/Parallel Adapter (#0215): This card, standard in all models except 5273 071, P71, provides a serial port and a parallel port. It occupies one expansion slot. The serial portion is fully programmable and supports asynchronous communications from 50 to 9600 baud. The back of the adapter has a 9-pin, D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept 8-bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. Note: This adapter does not support current loop operation. The 5218 Printer is not supported.

Floor Standing Enclosure (#0218): This optional enclosure is available to customers who desire removing their system unit from the work surface. With the system unit mounted vertically in the floor standing enclosure, only the essential parts of the system such as the display and keyboard need to be on the work surface. The unit may be positioned left or right of the workspace or under the workspace. Field Installation: Yes.

Personal Telephone Manager Adapter (#8982): Provides a telephone channel allowing the connection of the telephone to the IBM

3270 Personal Computer AT for utilization of advanced telephone function. The Personal Telephone Manager Program (P/N 6429190, #8989 of 5870-LLA) will provide advanced telephone applications. Refer to Programming Announcement dated October 15, 1985 and Product Announcement dated October 15, 1985. The user can obtain the "Technical Reference Manual" (SX27-3657) after December 30, 1985, which provides adapter interface information for writing application software to enhance telephone applications. The "Personal Telephone Manager Hardware Maintenance and Service Assembly" may be obtained by ordering SX27-3656. Maximum: One. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot, analog telephone (pulse or tone) and cord with modular plug, standard analog USOC RJ11C/W, RJ12C/W, RJ13C/W wall connector, or IBM Token-Ring Network wall connector. Customer Setup: Yes. Limitations: This feature is U. S. only.

The following 5150/5160 PC options may be ordered with the 5273:

- High Speed Adapter (#4920)
- 3117 Adapter (#4925)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5277 MOUSE

PURPOSE

The mouse is an easy-to-use device for controlling the graphics cursor on the 3179 Mdl G, 5279 or 5379 displays.

The operator controls the graphics cursor by moving the mouse on a thin pad, and can initiate action by pressing action keys on the mouse. As the mouse moves, it optically scans a pattern printed on the pad and sends movement coordinates through a thin cable to the workstation. The manner in which the screen cursor responds to the mouse movement is controlled by workstation programming, but normally it will be a linear relationship with some magnification.

MODELS

Model 1 001: Three key mouse with pad.

Prerequisites: 3979 or 5371 Mdl 12, 14 or 16, or 5373 Mdl X60, X61 or X62, IBM 5170 System Unit with a 3270-PC AT/G or AT/GX Option Kit installed.

Customer Set-up: Yes.

HIGHLIGHTS

High reliability and long life are achieved by the use of an advanced solid state optical system and microprocessor technology. This allows dynamic testing and optimizing of critical operating parameters throughout the life of the mouse. The only moving parts are the action keys. This makes the mouse suitable for use with the most demanding applications.

Operator Factors: The mouse glides quietly on its felt-lined feet, and use of a pad ensures that the operational characteristics and feel of the mouse are consistent and independent of the nature of the desk surface. The pad also protects the mouse from surface contaminants such as silicone wax polish, and prevents wear of the desk top.

Programming Support: Programming support is provided by the 3270-PC Graphics Control Program.

Warranty: Three month warranty.

IBM On-Site Service: Service means exchange or repair, at IBM's option. Service is available during normal IBM business hours at the machine location. On-site service is available in all areas.

Note: The IBM Personal Computer elements of the workstation may have a different warranty. These warranties may be upgraded to on-site service for an additional charge.

Maintenance Plans: Maintenance plans may be ordered by feature code:

IBM On-Site Exchange	#9830
Customer On-Site Exchange	#9824
Customer Carry-In Exchange	#9816

IBM On-site Exchange (#9830): IBM will disconnect the failing machine, connect the exchange machine, verify its operation, and remove the failing machine from the customer's location.

Customer On-Site Exchange (#9824): IBM will have an exchange machine delivered to the customer's location. The customer will disconnect the failing machine, connect the exchange machine, and verify its operation. The customer will follow IBM's instructions regarding the return of the failing machine; such return will be at IBM's expense.

Customer Carry-In Exchange (#9816): IBM will have an exchange machine available for the customer at a designated IBM Service/Exchange Center. The customer will deliver the failing machine to the IBM Center, pick up the exchange machine and take it to the customer's location, connect it, and verify its operation.

Note: In the above carry-in offerings, the customer, in lieu of delivery, may ship the failing machine prepaid, in the original shipping container or equivalent, to a designated IBM Service/Exchange Center and/or, upon request, IBM will ship the exchange or repaired machine back prepaid to customer locations within the United States and Puerto Rico.

Time and Materials: Time and materials service is available only from designated IBM Repair locations and requires the customer to deliver the failing unit to IBM.

Publications: Information on the installation, use and replacement of the 5277 is included in the following publications:

3270-PC/G Guide to Operations: For Work Stations that use the IBM 5279 Color Display, SA33-3140, 3270-PC/GX Guide to Operations: For Work Stations that use the IBM 5379 Displays, SA33-3139, and IBM 3179 Mdl G Color Graphics Display Station Description, GA18-2261

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5278 DISPLAY ATTACHMENT UNIT

(THE 5278 MODEL 1 IS NO LONGER AVAILABLE)

PURPOSE

The 5278 Display Attachment Unit mdl 2 is part of the 3270-PC/G and the 3270-PC AT/G Work Stations. It provides the alphanumeric, graphics and image processing functions, and the buffer storage necessary for the operation of the all-points-addressable (APA) 5279 Color Display.

MODEL 2

Model 2 002

Prerequisites: The 5371 System Unit mdls 12, 14 or 16, the 5373 System Unit mdls 160, 161, 162, A60, A61, A62, A29 and E29 or the 5170 System Unit mdls 068 and 099 with a 3270-PC AT/G Option Kit 5373-ZZZ (#7001) installed or the 5170 System Unit mdls 319 or 339 with a 3270-PC AT/G Option Kit 5373-ZZZ (#7011) installed.

Customer Setup (CSU): Yes.

HIGHLIGHTS

Provides the following functions when used with the 3270-PC Graphics Control Program:

- Vector to raster conversion
- Picture scaling and moving
- 2 Dimensional Transforms
- Clipping
- Correlation
- Lines, polylines and areas
- Area fill
- Arcs, fillets
- Characters (vector and image)
- 3270 character buffer emulation with display capacity of either 2,560 or 3,920 characters
- A 720 x 512 picture element APA display buffer
- PC character buffer emulation
- PC Color Graphics Adapter emulation

Cables: The 5278 mdl 2 is provided with the following cables:

- 1000mm cable to connect to the System Units.
- 680mm cable to connect to the 5279 Display.

Associated Products: The following associated products are recommended for a minimum workstation configuration:

- 5279 Color Display
- 5371 mdl 12, 14 or 16 System Unit and Keyboard, 5373 System Unit mdls 160, 161, 162, A60, A61 and A62 and keyboard or a 5170 System Unit with a 3270-PC AT/G Option Kit installed

- 5373 System Unit mdls 160, 161, 162, A60, A61, A62, A29 and E29 or a 5170 System Unit mdls 068 and 099 with a 3270-PC AT/G Option Kit 5373-ZZZ (#7001) installed or a 5170 System Unit mdls 319 and 339 with a 3270-PC AT/G Option Kit 5373-ZZZ (#7011) installed.

Customer Responsibilities: The customer is responsible for:

1. Adequate preparation of site, system and other vendor equipment.
2. Receipt at customer's receiving dock, unpacking and placement of the unit.
3. Physical set-up connection of cables, switch settings and check-out.
4. Performing customer problem analysis and resolution (CPAR).
5. (Canada only) > Calling a toll-free number for service. <)

Bibliography: See "KWIC Index" or specific system bibliography.

SPECIFY

Publications: Specify #3112 for the publications needed for attachment to the 5373 System Unit. This provides the "3270-PC AT/G Guide to Operations" and the "3270-PC AT/G Maintenance Information Manual".

Note: The 3270-PC AT/G Guide to Operations and the 3270-PC AT/G Maintenance Information Manual are automatically shipped with the 5373 mdls A29 and E29 and with the 5373-ZZZ (#7012).

Specify #7003 for the publications needed for attachment to the 5371 System Unit. This provides the "3270-PC/G Guide to Operations" and the "3270-PC/G Maintenance Information Manual".

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

5279 COLOR DISPLAY

PURPOSE

A 14-inch Color CRT Display for use with the 5278 Display Attachment Unit. It is part of the 3270-PC/G and 3270-PC AT/G Workstations.

MODELS

Model 1 001

Prerequisite:

A 5278 Display Attachment mdl 2. See M5278 pages.

Customer Setup (CSU): Yes.

HIGHLIGHTS

- Provides a steady bright image on a 14-inch (diagonal) screen.
- Provides a viewable area of nominal size 240mm (9.4 in.) by 181mm (7.1 in.).
- Eight colors are available for displaying either graphical or alphanumeric information.
- Anti-glare screen coating and high brightness minimize the perceived glare and reflections.
- The color convergence is set in the factory and normally requires no further adjustment by the customer.
- A display stand is available having either Tilt and Swivel adjustment or Tilt and Swivel with Height adjustment.
- A Virtual Device Interface 1.10 Driver is provided with each 5279. The VDI 1.10 Driver allows applications written to the Graphics Development Toolkit 1.10 to be run on the AT/G.

Cables: The 5279 is provided with the following cable:

Power cord of 1.8m (6 ft) with non-locking plug.

Customer Responsibilities: The customer is responsible for:

- Adequate preparation of site, system and other vendor equipment.
- Receipt at customer's receiving dock, unpacking and placement of the unit.
- Physical set-up, connection of cables, switch settings and checkout.
- Performing customer problem analysis and resolution (CPAR).
- (Canada only) Calling a toll-free number for service. <

Warranty: Three month warranty.

3270-PC AT/G Virtual Device Interface Driver - programs not warranted; media 90 days limited warranty.

IBM On-site Service: Service means exchange or repair, at IBM's option. Service is available during normal IBM business hours at the machine location. On-site service is available in all areas.

Note: The IBM Personal Computer elements of the workstation may have a different warranty. These warranties may be upgraded to on-site service for an additional charge.

Maintenance Plans: Maintenance plans may be ordered by feature code:

IBM On-Site Exchange - #9830
Customer On-Site Exchange - #9824
Customer Carry-In Exchange - #9816
Customer Carry-In Repair - #9821

IBM On-site Exchange (#9830): IBM will disconnect the failing machine, connect the exchange machine, verify its operation, and remove the failing machine from the customer's location.

Customer On-site Exchange (#9824): IBM will have an exchange machine delivered to the customer's location. The customer will disconnect the failing machine, connect the exchange machine, and verify its operation. The customer will follow IBM's instructions regarding the return of the failing machine; such return will be at IBM's expense.

Customer Carry-In Exchange (#9816): IBM will have an exchange machine available for the customer at a designated IBM Service/Exchange Center. The customer will deliver the failing machine to the IBM Center, pick up the exchange machine and take it to the customer's location, connect it, and verify its operation.

Customer Carry-In Repair (#9821): The customer will deliver the failing machine to a designated IBM Service/Exchange Center and, when it is repaired, pick up and return the repaired machine to the customer's location, connect it, and verify its operation.

Note: In the above carry-in offerings, the customer, in lieu of delivery, may ship the failing machine prepaid, in the original shipping container or equivalent, to a designated IBM Service/Exchange Center and/or, upon request, IBM will ship the exchange or repaired machine back prepaid to customer locations within the United States and Puerto Rico.

Time and Materials: Time and materials service is available only from designated IBM Repair locations and requires the customer to deliver the failing unit to IBM.

Bibliography: See "KWIC Index" or specific system bibliography.

SPECIFY (CANADA ONLY > (NONE) <)

- (Except Canada > Power (100-127V AC, or 200-240V AC, 1-phase, 3-wire, 50/60 Hz)
- Line Cord: 2.8m

Item No.	Country
6952308	Australia,
	New Zealand
6952344	Hong Kong
6952353	Singapore<

SPECIAL FEATURES

One of the following display stands is required for the 5279 Display:

Tilt and Swivel Stand with Height Adjustment: P/N 1887675 (#7675)

Tilt and Swivel Stand: P/N 1887676 (#7676)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

MACHINES
5288 PROGRAMMABLE CONTROL UNIT
PURPOSE

Provides processing, control, main storage, diskette storage, communications features, and device attachment capabilities for the 5280 Distributed Data System. Allows attachment of multiple 5281 Data Stations and/or 5282 Dual Data Stations and 5217, 5222, 5224, 5225, 5242, and 5256 Printers.

MODELS

5288 models are available depending on main storage capacity and the type of diskette drive included in the base machine. One drive is standard.

Model	Main Storage Capacity	Diskette
A01 *	32K	1
A05 *	32K	2D
C01	64K	1
C05	64K	2D
D01	96K	1
D05	96K	2D
E01	128K	1
E05	128K	2D
F01	160K	1
F05	160K	2D
H01	224K	1
H05	224K	2D
J01	288K	1
J05	288K	2D

* Not available after July 31, 1983.

Minimum Configuration: Any mdl of the 5288 with one 5281 Data Station or one 5282 Dual Data Station.

Customer Setup (CSU): The 5288 is designated Customer Setup, and offers customers ease of setup and relocation flexibility. The customer setup allowance is two days (or country practice). One copy of *IBM 5280 User's Setup Procedures* (GA21-9365) is included with each 5288.

HIGHLIGHTS

- System flexibility allows specification of configuration to meet specific user requirements for data entry, associated processing, and communications.
- Base unit contains controller, main storage, and diskette drive capability.
- Multiple microprocessors provide processing and independent I/O control.
- Stored program function.
- Multiprogramming capability with up to eight main storage partitions.
- Powerful and extensive data editing function.
- 10MB disk storage drives available.
- Compact diskette drives housed within the 5288 support Diskette 1 or Diskette 1, 2, and 2D providing up to 4.8M bytes of storage capacity.
- Addition of optional disk and/or diskette drives within attached 5281 Data Stations and/or 5282 Dual Data Stations (diskette only) provide a total system capacity of eight drives ... one diskette and seven disk or diskette drives in any combination.
- Maximum of four keyboard/displays with attachment of 5281 and/or 5282 data stations.
- Attachment capability for up to eight printers.
- Security features for data asset protection.
- Independent data station operation through multiprogramming and system resource sharing.
- Communications adapters provide both SDLC and BSC capability.
- Communications programming support available for RJE, batch, and interactive communications via SNA/SDLC or BSC.

5288 Components

Controller: Provides processing capability, control, main storage, and optional I/O attachments and communications features. Controls all functions of the 5288 and attached 5281 Data Stations, 5282 Dual Data Stations, and 5217, 5222, 5224, 5225, 5242, and 5256 Printers. Multiple microprocessor architecture allows processing and I/O operations (e.g., diskette, keyboard/display, communications) to operate independently. The 5288 provides 64K of main storage that can be expanded to a maximum of 288K. Multiprogramming capability is available through a partitioned memory. The number of partitions (up to eight) and their size (6K to 64K) are user-specified with a facility provided in 5280 System Control Programming (5708-SC1). Special features provide for the attachment of 5281 and 5282 data stations (maximum, four keyboards), and 5217, 5222, 5224, 5225, 5242, and 5256 Printers (maximum, eight printers). The communications adapters (special features) each provide both SDLC and BSC communications under stored program control.

Disk/Diskette: One diskette drive is standard, and its type is determined by the 5288 mdl number. Three physical drive positions are available on the 5288 for optional disk and/or diskette drives ... see "Special Features". For the optional drives, any combination (up to three) of disk and/or diskette drives is allowed. For a 5288 system, including auxiliary data stations, the maximum number of optional disk/diskette drives is seven.

Disk: In addition to one diskette drive, the 5288 can contain up to three 10MB Disk Storage Drives ... see "Special Features". The disk storage is a non-removable direct access medium. Capacity and access times are as follows:

Bytes/Sector	256
Bytes/Cylinder	32,768
Cylinders *	303
Capacity * (bytes)	9,928,704
Access Time (ms)	
Minimum (cyl to cyl)	16.6
Average (102 cyl)	85
Maximum	205
Rotation Speed (rpm)	3,600

* Available to the user for programs and data.

Diskette: Two types of compact diskette drives are available with the 5288: a diskette drive which can read/write Diskette 1 and a diskette drive which can read/write Diskette 1, 2, and 2D. Capacity per drive ranges from 0.25M bytes to 1.2M bytes. The formats for the diskettes are:

Diskette 1

Format	Bytes/Sector	Capacity
1	128	246KB *
2	256	284KB
3	512	303KB

* 243KB when used for Basic Exchange

Diskette 2

4	128	492KB
5	256	568KB
6	512	606KB

Diskette 2D

7	256	985KB
8	512	1136KB
9	1024	1212KB

For diskette data exchange with other systems, the following exchange types are supported: Basic Exchange (Formats 1 and 4 above), H Exchange (Format 7 above), and I Exchange (all of the above formats). Diskettes can be interchanged with other IBM systems and devices which support a compatible diskette exchange type. Examples are the System/3, System/32, System/34, System/38, Series/1, S/370, 303X, 4300, 3540, 3740, 3747, 3770, 3790, 5110, 5230, 5260, and 8100.

The instantaneous data transfer rate using Diskette 1 or 2 is 31.2K bytes/sec; for Diskette 2D, 62.5K bytes/sec. Rotational speed of both types of drives is 360 rpm. Diskette read or write is overlapped with seek. Diskette operations are overlapped with processing and other I/O device operations.

Auxiliary Data Stations: The 5281 Data Station and the 5282 Dual Data Station can be attached to the 5288 in any combination to provide

MACHINES
5288 Programmable Control Unit (cont'd)

a maximum of four keyboards. In Chart A below, all possible combinations are presented. Each vertical column represents a valid combination of machine type quantities. At least one 5281 or 5282 must be attached.

Chart A

Machine	Quantity							
5281	1	2	3	4	1	2	0	0
5282	0	0	0	0	1	1	1	2

For maintenance purposes, one auxiliary data station (designated as the "First Auxiliary Data Station") must be installed within sight of, and have easy access to, the 5288. This data station is attached via the First Auxiliary Data Station Attachment (special feature). All other data stations are attached via an Auxiliary Data Station Attachment, Additional (special feature). *Each data station requires a separate attachment.* Each data station is cable attached (see M5281 or 5282 "Accessories"). The maximum cable length is 61 meters (200 feet).

Each data station can have the same or different keyboard types (data entry, data entry with proof arrangement, typewriter). In addition, each data station can have a different keyboard language (see "Specify"). Before creating a diskette data set to be used on a system with mixed keyboard languages, or between systems which utilize different languages, the user should compare the hexadecimal values of characters generated by each keyboard language. See *IBM 5280 System Concepts* (GA21-9352).

The display size (480, 960, or 1920 characters) of attached data stations is determined by the 5288 auxiliary data station attachment (special feature). *All data stations must have the same display size(s).* The 5280 Communications Utilities licensed program (5708-DC1) requires a display size(s) of 960 or 1920 characters.

An attached 5281 can have zero, one or two disk or diskette drives. An attached 5282 can have zero, one, or two diskette drives. These drives are designated "remote" (from the 5288). Remote drives are attached via a Remote Disk/Diskette Drive Attachment to the 5288 ... see "Special Features". A cable is required ... see M5281 or 5282 "Accessories".

Printers: The 5217, 5222, 5224, 5225, 5242, and 5256 printers are available for attachment to the 5288. A maximum of eight printers can be attached ... see "Special Features".

Security: A non-display input mode on attached 5281 Data Stations and 5282 Dual Data Stations allows data to be entered from the keyboard without being displayed on the screen. A Security Keylock (special feature) prevents keyboard entry or display of data on all auxiliary data stations and, on a communicating 5288, prevents initiation of communications. In addition, a communicating 5288 can exchange identification sequences with the host, which assists the user in controlling access to data. A Magnetic Stripe Reader (special feature) is available for the 5281 and 5282 which may be used to enter user identification. This assists user program routines in auditing and controlling operator access to data.

Communications: The Communications Adapter (#2500) operates under stored program control and allows for either SDLC or BSC data link control over a single communications line. This feature allows the 5288 to communicate on a switched point-to-point, nonswitched point-to-point, or multipoint line at speeds up to 4800 bps. On a multipoint line, the 5288 operates as a tributary station. The 3270 Emulation Communications Adapter (#3270) provides the same function as #2500 (above) and, in addition, provides support for the 5280 - 3270 Emulation (5708-EM1) licensed program.

Connection to the line is supported by a Line Interface feature. Operation is half-duplex mode over a switched network on half-duplex facilities, or half-duplex mode over nonswitched (or equivalent private) communications lines on duplex or half-duplex facilities. Switched network support includes manual dial and manual or auto-answer (where the attached modem supports this capability). The 5288 at each termination (drop point) of a communications line must use the same clocking source (modem or business machine). Units must be set to operate at the same transmission rate, use the same transmission code, and the same 2- or 4-wire connection to the line. Compatible modems must be used at all terminations on a network.

The 5288, using stored program control, communicates using BSC protocol with:

- A Series/1 equipped with #2074, #2075, or #2093/#2094.
- A System/3 equipped with #2074, #2084, or #2094.

- A System/32 equipped with #2074.
- A System/34 equipped with #2500, #3500, or #4500.
- A System/36 (5360) equipped with #2500 or #4500.
- A System/36 (5362) equipped with #2910 or #2915.
- A System/38 with appropriately configured BSC adapter and sub-features (point-to-point only).
- A S/370 via an Integrated Communications Adapter, a 4331 via a Communications Adapter, or a S/370, 303X, or 4300 via a 2701 Data Adapter Unit, or a 3704, 3705, or 3725 Communications Controller with the Network Control Program (ACF/NCP) or the Partitioned Emulation Program (PEP), any of which are equipped with a binary synchronous communications adapter and appropriate sub-features.
- A 3741 mdl 2 or 4.
- A 3747 Data Converter equipped with #1660.
- A 5265 communicating mdl (XX2).
- A 5280 equipped with #2500 or #3270.

The 5288, using stored program control, communicates in SNA/SDLC mode with a 4331 via a Communications Adapter, a S/370 via an Integrated Communications Adapter, an 8100 with DPPX/BASE, or a S/370, 303X, or 4300 via a 3704, 3705, or 3725 Communications Controller equipped with appropriate features. See M3704, 3705, or 3725 pages. The 5288, using the 3270 Emulation Communications Adapter, communicates in SNA/SDLC mode with an 8100 Information System. See the 5280 programming pages for a description of the communications program support available and any special feature requirements.

Communications Facilities and Attachments: A parameter in the 5280 Communications Utilities licensed program (5708-DC1) is used for the selection of certain data communications characteristics such as full-speed or half-speed, internal or external modem clocking, line type, station address, etc.

The CCITT Interface (#3701) permits operation with PTT mandatory modems complying with:

- CCITT Recommendations V.23, V.24, V.25, and V.28, and ISO Standard 2110 for operation at 600/1200 bps on the public switched telephone network.
- CCITT Recommendations V.23, V.24, and V.28, and ISO Standard 2110 for operations at 600/1200 bps on a nonswitched voice grade line.
- CCITT Recommendations V.24, V.25, V.26BIS at V.28, and ISO Standard 2110 for operation at 2400 bps on the public switched telephone network.
- CCITT Recommendations V.24, V.26, and V.28, and ISO Standard 2110 for operation at 2400 bps on a nonswitched voice grade line.
- CCITT Recommendations V.24, V.27, and V.28, and ISO Standard 2110 for operation at 4800 bps on a nonswitched voice grade line.

The CCITT Interface (#3701) also permits operation at 2400 and 4800 bps on certain public data networks. See the M2700 pages for information on these.

IBM Modems: One IBM modem can be attached to the Communications Adapter (#2500) or the 3270 Emulation Communications Adapter (#3270). **Prerequisites:** #3701.

Modem	Speed (bps)	Facility
3863	2400	Switched, Nonswitched
3868 mdl 1	2400	Nonswitched
3864	4800	Switched, Nonswitched
3868 mdl 2	4800	Nonswitched
3872	2400/1200	Nonswitched
3976 mdl 3	1200/600	Switched, Nonswitched

Note: The 5288 does not support Automatic Call Originate (#1091) on the 3872. For communication capabilities, product utilization, and special features see M2700, 3863, 3864, and 3872 pages.

IBM Data Encryption Devices: An IBM 3845 or 3846 Data Encryption Device may be attached between the 5288 communications adapter and the external modem. **Note:** Refer to M2700, 3845, and 3846 pages for information on 3845 or 3846 configuration and communication capability. **Prerequisites:** #3701.

MACHINES
5288 Programmable Control Unit (cont'd)
Communications References:

- See the Programming pages for possible restrictions.
- See M2700 pages for additional information concerning modems, communications facility, machine attachment requirements, terminal intermix, operating capabilities and customer responsibilities.
- Refer to the *IBM 5280 Planning and Site Preparation Guide* (GA21-9351) for physical planning information.

Communications Cable: A communications cable length is required. See "Specify".

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of the problem determination procedures and recovery routines that are easily understood and used by the operator. The procedures are described in the *IBM 5280 Machine Verification Manual* (GA21-9357).

Customer Responsibilities: The customer is responsible for:

- Adequate site, system, and other vendor preparation.
- Obtaining a firm installation date for the start of communications facilities and services (including any required modems). The IBM Marketing Representative must assure that a firm installation date is established.
- Receipt, unpacking, and placement of the 5288.
- Installation and maintenance of signal cables and associated parts for attaching a 5217, 5222, 5224, 5225, 5242, 5256, 5281, or 5282 to the 5288.
- The customer must be advised, in writing, of certain responsibilities related to the installation and maintenance of PTT facilities/services as well as the IBM equipment. For further information, see M2700 pages.
- Physical setup, connection of cables to communications lines/modems and IBM devices incorporating protected access areas, modem attenuation setting and checkout in accordance with instructions supplied by IBM. This may require the assistance of the IBM CE in some countries.
- Using and following the 5280 problem determination procedures prior to calling for IBM service.
- Notifying IBM of intent to relocate and following IBM instructions for relocation of the 5288.
- Relocation of the 5288, if required, to allow IBM service access.
- When adding a 5281 or 5282 to the 5288, the customer may have to modify the system configuration specifications. See *IBM 5280 System Control Programming Reference/Operation Manual* (GC21-7824).
- Disconnecting, packing, and removal to the customer's shipping dock at the time of discontinuance. Removal instructions and packing materials (if required) will be ordered by the branch office.

Publications: *IBM 5280 General Information* (GA21-9350), *IBM 5280 Planning and Site Preparation Guide* (GA21-9351).

Notes:

1. Device Attachments: Appropriate special features are required to attach auxiliary data stations (5281, 5282) and some I/O units ... see "Special Features".
2. 5280 System Control Programming (5708-SC1) should be ordered at equipment order entry time.
3. For physical planning information, see *IBM 5280 Planning and Site Preparation Guide* (GA21-9351).

SPECIFY

- Voltage (AC, 1-phase): One must be specified.

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	208V #9902
220V #2813	220V #2803
235V #2814	230V #9904

- Power Cord and Plug: For a power cord with a standard plug, specify #2709 (for certain countries). The plug available for each country is described in *IBM 5280 Distributed Data System Planning and Site Preparation Guide* (GA21-9351). If a standard plug is not listed for your country, or is not desired for your customer, specify #2710 for a power cord without a plug. (Canada only) In Canada, specify #2715 for locking plug, or #2709 for non-locking plug. +)

- Color: Pearl white only (no specify required).

- Primary host system that will process the data captured by the 5288:

System/3	#9501
System/32	#9502
System/34	#9503
System/36	#9503
System/38	#9504
Series/1	#9505
Other Small IBM System	#9506
S/360	#9507
S/370 mdl 138 and Below	#9508
S/370 mdl 145 and Above	#9509
3031, 3032, 3033	#9510
4331, 4341	#9511
8100	#9512
Other Large IBM System	#9513
Non-IBM System	#9514
Host System Unknown	#9515
No Host System	#9516

- Documentation Group (for documentation included with the machine):

Canadian French	#0077
English US	#0056
France	#0064
Germany	#0057
Italy	#0068
Japan English	#0055
Japan Katakana	#0073
Spain	#0060
Spanish Speaking	#0069

- Primary Display Character Set Usage:

Country National	#2791
Multinational	#2792

- Communications Cable Length (with #2500 or #3270): Required for attaching the 5288 to the communications facility. #9010 for a 6 meter (20 foot) cable or #9015 for a 12 meter (40 foot) cable. Specify this cable length only once per system.

- Mandatory Specify Codes for Communications: One selection must be specified from each of the following tables. Entries selected from Tables D, E, and F will be used to preset hardware functions during manufacture. Selection from each of the other tables should be based on prime usage.

Table A - Line Control

BSC	#9400
SDLC	#9401

Table B - Transmission Code

EBCDIC	#9060
ASCII	#9061

5288 Programmable Control Unit (cont'd)
Table C - Prime Usage

S/360	#9570
3031 or S/370	
mdl 138 and Below	#9277
3032, 3033, or S/370	
mdl 145 and Up	#9278
4300	#9596
4381	#9597
Series/1	#9599
System/3	#9580
System/32	#9591
System/34	#9593
System/36	#9593
System/38	#9594
3740/3747	#9579
5260	#9600
5280	#9598
Other IBM	#9275
Non-IBM	#9276

Table D - Transmission Rate

600 bps	#9750
1200 bps	#9751
2000 bps	#9752
2400 bps	#9753
4800 bps	#9754

Table E - Network Attachment

Point-to-Point (nonswitched)	#9481
Point-to-Point (switched)	#9483
Multipoint Tributary	#9482
Local Attach	#9485

Table F - Line Facility Attachment

Duplex (4-wire only)	#9391
Half-Duplex	#9392

Table G - Host Application

RJE, MRJE, SRJE	#9440
CICS/VS	#9441
IMS/VS	#9442
Other	#9443

SPECIAL FEATURES
NON-COMMUNICATIONS FEATURES

Replaced parts from any special feature installation or removal remain the property of the customer.

Printers: Attachment of the 5217, 5222, 5224, 5225, 5242, and 5256 Printers is provided by one of four special features. Up to eight printers, in any combination, may be attached consistent with special feature limitations. Printer speeds may be affected by the customer's program, application load, forms design and/or the number of printers attached to the system.

Single Twinaxial Printer Attachment (#1155): Provides a single port for the attachment of 5224 (mdl 1 or 2), 5225 (mdl 1, 2, 3, or 4) and/or 5256 (mdl 1, 2, or 3) Printers to a single twinaxial port. A maximum of seven printers can be attached. The maximum cable length is 1,525 meters (5,000 feet). **Limitations:** Cannot be installed with the Multiple Twinaxial Printer Attachment (#1160), the Single 5222 Printer Attachment (#1157), or the Multiple Start/Stop-Twinaxial Printer Attachment (#1162). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** If multiple printers are attached, each printer on the cable, except the last, requires a Cable-Thru feature.

Single 5222 Printer Attachment (#1157): [Not available after July 31, 1983] Provides a single port for the attachment of one 5222 Printer. Attachment is by a double twisted pair cable. A 6 meter (20 foot) cable is provided with the printer. An extension cable accessory is available to provide a total cable length of up to 61 meters (200 feet) (see M5222 "Accessories"). **Limitations:** Cannot be installed with the Multiple Start/Stop-Twinaxial Printer Attachment (#1162), the Single Twinaxial Printer Attachment (#1155), or the Multiple Twinaxial Printer Attachment (#1160). **Maximum:** One. **Field Installation:** Yes.

Multiple Twinaxial Printer Attachment (#1160): [Not available after July 31, 1983] Provides four ports for attaching, via twinaxial cable, 5224 (mdl 1 or 2), 5225 (mdl 1, 2, 3, or 4) and/or 5256 (mdl 1, 2, or 3) Printers. A maximum of eight printers can be attached. The maximum cable length is 1,525 meters (5,000 feet). **Limitations:** A maximum of

seven printers can be attached to a single port (using Cable-Thru feature). Cannot be installed with the Single Twinaxial Printer Attachment (#1155), the Single 5222 Printer Attachment (#1157), or the Multiple Start/Stop-Twinaxial Printer Attachment (#1162). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** If multiple printers are attached to one port, each printer on the cable, except the last, requires a Cable-Thru feature.

Multiple Start/Stop-Twinaxial Printer Attachment (#1162): Attaches up to eight printers. Provides four Start/Stop (5217, 5222, 5242) Printer ports and one Twinaxial Printer (5224/5225/5256) port. A single 5217, 5222, or 5242 mdl 2 Printer can be attached to each Start/Stop port. Each Start/Stop Printer is attached by a double-twisted pair cable. A 6 meter (20 foot) cable is provided with each printer. For the 5222, an extension cable accessory is available to provide a maximum cable length of up to 61 meters (200 feet) ... see M5222 "Accessories". From one to seven twinaxial printers (5224 mdl 1 or 2 and/or 5225 mdl 1, 2, 3, or 4 and/or 5256 mdl 1, 2, or 3) can be attached to the twinaxial port, using a single twinaxial cable. The maximum cable length is 1,525 meters (5,000 feet). **Limitations:** Cannot be installed with the Single Twinaxial Printer Attachment (#1155), the Single 5222 Printer Attachment (#1157), or the Multiple Twinaxial Printer Attachment (#1160). A maximum of seven printers can be attached to the twinaxial port (using Cable-Thru feature). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** If multiple printers are attached to the twinaxial printer port, each printer on the cable, except the last, requires a Cable-Thru feature. If #1162 was shipped before April 1, 1983, the 5288 also requires EC 467318 for attachment of the 5217 or 5242.

First Auxiliary Data Station Attachment (#1245, #1250, #1255, #1260, #1265 ... and for Katakana #0245, #0250, #0255, #0260, #0265): To attach the first 5281 Data Station or 5282 Dual Data Station. This feature provides the display graphic character generator for the attached data station. The standard character generator provides all available character sets except Katakana. The character set is user-selectable. The Katakana character generator provides Katakana only. See "Type Catalog" for available character sets. This feature also determines the display size of the auxiliary data station. All data stations on the 5280 system must have the same display size(s). Attachment is by cable ... see "Accessories". The maximum cable length is 61 meters (200 feet). Select one feature from the table below.

Data Station	Display Size(s)	Character Generator Language	Order Feature Number
5281	480	Standard	#1245 *
5281	480	Katakana	#0245 *

Limitations: Cannot be installed with the Auxiliary Data Station, Add'l (#0275, #0280, #0290, #1275, #1280, #1290).

5281	960	Standard	#1250 *
5281	960	Katakana	#0250 *

Limitations: Cannot be installed with the Auxiliary Data Station, Add'l (#0270, #0280, #0285, #1270, #1280, #1285).

5281	1920	Standard	#1255
5281	1920	Katakana	#0255

Limitations: Cannot be installed with Auxiliary Data Station, Add'l (#0270, #0275, #0285, #0290, #1270, #1275, #1285, #1290).

5282	480	Standard	#1260 *
5282	480	Katakana	#0260 *

Limitations: Cannot be installed with the Auxiliary Data Station, Add'l (#0275, #0280, #0290, #1275, #1280, #1290).

5282	960	Standard	#1265 *
5282	960	Katakana	#0265 *

Limitations: Cannot be installed with Auxiliary Data Station, Add'l (#0270, #0280, #0285, #1270, #1280, #1285).

* Not available after July 31, 1983.

Maximum: One of the above. **Field Installation:** Yes.

Auxiliary Data Station Attachment, Add'l (#1270, #1275, #1280, #1285, #1290 ... and for Katakana #0270, #0275, #0280, #0285, #0290): To attach one 5281 Data Station or one 5282 Dual Data Station. This feature provides the display graphic character generator for the attached data station. The standard character generator provides all available character sets except Katakana. The character set is user-selectable. The Katakana character generator provides

5288 Programmable Control Unit (cont'd)

Katakana only. See "Type Catalog" for available character sets. This feature also determines the display size of the auxiliary data station. All data stations on the 5280 system must have the same display size(s). Attachment is by cable ... see "Accessories". The maximum cable length is 61 meters (200 feet). Select the appropriate features from the table below.

Data Station	Display Size(s)	Character Generator Language	Order Feature Number
5281	480	Standard	#1270 *
5281	480	Katakana	#0270 *

Limitations: Cannot be installed with the Auxiliary Data Station, Add'l (#0275, #0280, #0290, #1275, #1280, #1290). **Prerequisites:** #0245, #0260, #1245, or #1260.

5281	960	Standard	#1275 *
5281	960	Katakana	#0275 *

Limitations: Cannot be installed with the Auxiliary Data Station, Add'l (#0270, #0280, #0285, #1270, #1280, #1285). **Prerequisites:** #0250, #0265, #1250, or #1265.

5281	1920	Standard	#1280
5281	1920	Katakana	#0280

Limitations: Cannot be installed with Auxiliary Data Station, Add'l (#0270, #0275, #0285, #0290, #1270, #1275, #1285, #1290). **Prerequisites:** #0255 or #1255.

5282	480	Standard	#1285 *
5282	480	Katakana	#0285 *

Limitations: Cannot be installed with the Auxiliary Data Station, Add'l (#0275, #0280, #0290, #1275, #1280, #1290). **Prerequisites:** #0245, #0260, #1245, or #1260.

5282	960	Standard	#1290 *
5282	960	Katakana	#0290 *

Limitations: Cannot be installed with Auxiliary Data Station, Add'l (#0270, #0280, #0285, #1270, #1280, #1285). **Prerequisites:** #0250, #0265, #1250, or #1265.

* Not available after July 31, 1983.

Maximum: The 5281 and 5282 can be attached in any combination to provide a maximum of four keyboards ... see Chart A above for valid combinations. **Field Installation:** Yes.

Auxiliary Data Station Disk/Diskette Drives: Disk and diskette drives housed within a 5281 Data Station or 5282 Dual Data Station (diskette only) are designated as "remote" (from the 5288). The drives can be any combination of disk or diskette. Remote drives require the 5288 attachment special features (#1300, #1301, #1302) described after Chart B below. An attachment can service two disk or diskette drives, and the drives may be in the same or different data stations. A cable is required ... see M5281 or 5282 "Accessories".

If the base 5288 contains one or two disk or diskette drives, the maximum number of remote drives is six. If the base 5288 contains three or four drives, the maximum number of remote drives is four.

Chart B below presents all valid disk/diskette drive quantities and location combinations with respective special feature requirements.

Chart B

These Combinations		Require These Special Features *		
Base 5288	Remote	#1300	#1301	#1302
1 or 2	0			
1 or 2	1	X		
1 or 2	2	X		
1 or 2	3	X	X	
1 or 2	4	X	X	
1 or 2	5	X	X	X
1 or 2	6	X	X	X
3 or 4	0			
3 or 4	1		X	
3 or 4	2		X	
3 or 4	3		X	X
3 or 4	4		X	X

* Note: If an attachment services two drives, the drives may be in the same or different data stations.

Remote Disk/Diskette Drive Attachment, 1st (#1300): Required to attach disk, Diskette 1 or Diskette 2D drives housed within a 5281 or 5282 (diskette only for 5282). When the base 5288 contains one or two drives, this feature is required to attach the first and second remote drives. **Maximum:** One. **Field Installation:** Yes. **Corequisites:)** #4400, if one or more #3410s are installed in one or more attached 5281s.

Remote Disk/Diskette Drive Attachment, 2nd (#1301): Required to attach disk, Diskette 1 or Diskette 2D drives housed within a 5281 or 5282 (diskette only for 5282). When the base 5288 contains one or two drives, this feature is required to attach the third and fourth remote drives. When the base 5288 contains three or four drives, this feature is required to attach the first and second remote drives. **Maximum:** One. **Field Installation:** Yes. **Corequisites:** #4400, if one or more #3410s are installed in one or more attached 5281s.

Remote Disk/Diskette Drive Attachment, 3rd (#1302): Required to attach disk, Diskette 1, or Diskette 2D drives housed within a 5281 or 5282 (diskette only for 5282). When the base 5288 contains one or two drives, this feature is required to attach the fifth and sixth remote drives. When the base 5288 contains three or four drives, this feature is required to attach the third and fourth remote drives. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #1301.

Disk/Diskette Drives (#3401, #3402, #3410):

Diskette 1 Drive (#3401): An additional diskette drive which can read/write Diskette 1.

Diskette 2D Drive (#3402): An additional diskette drive which can read/write Diskette 1, 2, and 2D.

Disk Storage Drive (#3410): A 10MB non-removable direct access storage device. **Note:** The disk storage drive(s) must be installed to the right of the diskette drive(s).

Maximum: The maximum number of optional disk and/or diskette drives housed within a 5288 is three. The maximum number of optional drives on a 5288 system, including auxiliary data stations, is seven. The drives may be any combination of disk and diskette. **Field Installation:** Yes.

Elapsed Time Counter (#3610): Used to measure elapsed real time. It is required for SNA operations under the 5280 Communications Utilities (5708-DC1) and 5280 - 3270 Emulation (5708-EM1). It is required by DE/RPG (5708-DE1) and the Key Entry Utility [part of 5280 Utilities (5708-UT1)], if the user desires to maintain the elapsed time production statistic. **Limitations:** Cannot be installed with the Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955). **Maximum:** One. **Field Installation:** Yes.

Remote Disk Prerequisite (#4400): Provides control function required to accommodate one or more Disk Storage Drives (#3410) installed in one or more attached 5281 Data Stations. **Maximum:** One. **Field Installation:** Yes. **Corequisites:** #1300 and/or #1301.

Magnetic Stripe Reader Adapter/Elapsed Time Counter (#4955): Provides the following: The Magnetic Stripe Reader Adapter provides control for up to four Magnetic Stripe Readers (#4950) on attached 5281 Data Stations and/or 5282 Dual Data Stations. The Elapsed Time Counter is used to measure elapsed real time. It is required for SNA

5288 Programmable Control Unit (cont'd)

operations under the 5280 Communications Utilities (5708-DC1) and 5280 - 3270 Emulation (5708-EM1). It is required by DE/RPG (5708-DE1) and the Key Entry Utility [part of 5280 Utilities (5708-UT1)], if the user desires to maintain the elapsed time production statistic. **Limitations:** Cannot be installed with the Elapsed Time Counter feature (#3610). **Maximum:** One. **Field Installation:** Yes.

Security Keylock (#6340): Provides a single, key-operated switch with three positions for controlling operations on all attached 5281 Data Stations and 5282 Dual Data Stations: "Lock" position prevents operator entry and display of data and prevents initiation of communications. "Local" position allows operator entry and display of data. "Normal" position allows initiation of communications in addition to operator entry and display of data. Two unique keys are provided: one allows selection of "Lock"/"Local", the other allows selection of "Lock"/"Normal". On a non-communicating 5288, both operating positions ("Local" and "Normal") provide "Local" position operation. **Maximum:** One. **Field Installation:** Yes.

2nd Application Microprocessor (#6800): A microprocessor which performs identical functions and operates concurrently with the first (base) application microprocessor. This feature provides more processing power and is designed as an aid to performance improvement in a multiprogramming environment which has heavy processor utilization. **Maximum:** One. **Field Installation:** Yes.

COMMUNICATIONS FEATURES

Communications Adapter (#2500): Required to attach a communications line via appropriate interface or modem. In conjunction with stored program control, this feature permits the 5288 to function on a switched or nonswitched public or private communications line. The adapter provides both BSC and SDLC. The proper line protocol is enabled at program execution time. The adapter also provides a 1200 bps clocking capability for use with the 1200 bps Integrated Modem (#5500, #5501(Canada only+), #5502, #5507, #5508 +) or an external modem. A Communications Utilities (5708-DC1) parameter activates this capability. **Limitations:** Cannot be installed with the 3270 Emulation Communications Adapter (#3270). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** [1] A line interface special feature; #5500, #5501(Canada only+), #5502, #5507, #5508, +) #3701, or #5650. [2] See the Programming section for 5280 Communications Utilities (5708-DC1) minimum system and feature requirements. See "Specify" for required communications cable length and mandatory specify codes.

3270 Emulation Communications Adapter (#3270): Supports the 5280 - 3270 Emulation (5708-EM1) licensed program and, in conjunction with stored program control, permits the 5288 to function on a switched or nonswitched public or private communications line. This adapter is required to attach to a communications line via the appropriate interface or modem and provides both BSC and SDLC. The proper line protocol is enabled at program execution time. The adapter also provides a 1200 bps clocking capability for use with the 1200 bps Integrated Modem (#5500, #5501(Canada only+), #5502, #5507, #5508 +) or an external modem. A Communications Utilities (5708-DC1) parameter activates this capability. Keyboard interpretation functions are provided in support of the 5280 - 3270 Emulation licensed program. **Limitations:** Cannot be installed with Communications Adapter (#2500). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** [1] A line interface special feature; #5500, #5501(Canada only+), #5502, #5507, #5508, +) #3701, or #5650. [2] Attached 5281 Data Station(s) with a display size of 1920 characters (5288 feature #1255, #1280); [3] See the Programming section for 5280 Communications Utilities (5708-DC1) and 5280 - 3270 Emulation (5708-EM1) minimum system and feature requirements. See "Specify" for required communications cable length and mandatory specify codes.

CCITT Interface (#3701): Provides the appropriate cable and interface logic necessary to attach an external modem (either an IBM or PTT mandatory modem meeting CCITT V.24/V.28 characteristics and ISO Standard 2110. Refer to M2700 pages). Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Limitations:** Cannot be installed with Digital Data Service (DDS) Adapter feature (#5650) or 1200 bps Integrated Modem (#5500, #5501(Canada only+), #5502, #5507, #5508 +). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500 or #3270. (Japan only+ **Specify:** #2946 when attaching a non-IBM modem, this satisfies NTT's DTE self-test requirement. +)

1200 bps Integrated Modem (#5500, #5501): [#5500 not available after July 31, 1983] A modem for SDLC or BSC data transmission at 600/1200 bps over nonswitched or switched facilities. Half-speed

operation at 600 bps is indicated via a 5280 Communications Utilities (5708-DC1) parameter. Available in two different versions: #5500 - nonswitched and #5501 - switched with auto-answer. The non-switched version (#5500) provides a cable for attachment directly to a nonswitched (2- or 4-wire) facility, DA3. The switched with auto-answer version (#5501) provides a cable for attachment to the switched network facility, CA2. (Canada only+ Attachment to the switched facilities is via an IBM-provided cable to a common carrier arrangement type CBS or equivalent. +) The devices communicating with the 5288 must also be equipped with a compatible 1200 bps modem. **Limitations:** Cannot be installed with CCITT Interface (#3701) or Digital Data Service (DDS) Adapter (#5650). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500 or #3270. (Japan only+ **Specify:** #2943 for attachment of feature #5500 to NTT D1 Service. +)

(Canada only+)

1200 bps Integrated Modem (#5502, #5507, #5508): [#5502, #5507 not available after July 31, 1983] A modem for SDLC or BSC data transmission at 600/1200 bps over nonswitched or switched facilities. Half-speed operation at 600 bps is indicated via a 5280 Communications Utilities (5708-DC1) parameter. Available in three different versions: #5502 - switched without auto-answer, #5507 - non-switched with switched network backup manual answer capability, and #5508 - nonswitched with switched network backup auto-answer capability. The nonswitched versions (#5507 and #5508) provide a cable for attachment directly to a nonswitched (2- or 4-wire) facility, DA3. The switched with manual answer version (#5502) provides a cable for attachment to the switched facility via a common carrier arrangement type CBS or equivalent. The devices communicating with the 5288 must also be equipped with a compatible 1200 bps modem. **Limitations:** Cannot be installed with CCITT Interface (#3701), Digital Data Service (DDS) Adapter (#5650), or 1200 bps Integrated Modem (#5500, #5501). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500 or #3270. +)

Digital Data Service (DDS) Adapter (#5650): An adapter for SDLC or BSC data transmission at speeds of 2400 or 4800 bps. The DDS Adapter may only be used to locally connect a 5288 to another supported device which has a compatible DDS Adapter. This connection requires a special DDS Adapter Connector (see "Accessories") and supports point-to-point connections only. The maximum length of the connection is the sum of the modem cable lengths supported by the two devices. No modem is required. **Limitations:** Cannot be installed with CCITT Interface (#3701) or 1200 bps Integrated Modem (#5500, #5501(Canada only+), #5502, #5507, #5508 +). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500 or #3270.

MODEL CONVERSIONS

Field installable.

PURCHASE CONSIDERATIONS

The upgrade purchase prices for model conversions may be greater than the purchase price differentials. The customers should carefully evaluate their future requirements when purchasing a system. Replaced parts from any model conversion become the property of IBM.

ACCESSORIES

Keylock Keys: The 5288 with Security Keylock (#6340) is shipped with two unique keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys only to original purchaser.) With each order of quantity of one, customer receives two keys (one key of each kind). Key identification numbers must accompany each order. **Specify P/N 4177799** or, if EC 868325 is installed, **specify P/N 6044248**. Allow six to eight weeks for delivery.

DDS Adapter Connector: A specially designed connector allows the cable from a 5288 DDS Adapter to be connected to the cable of another supported device which has a compatible DDS Adapter. This provides for the local connection of two devices without the use of any modems or channel service units. Only one DDS Adapter Connector is required per connection. The maximum length of the connection is the sum of the modem cable lengths of the two devices. This is a purchase-only item. **Specify P/N 4236967**. Allow six to eight weeks for delivery. **Maximum:** One per Digital Data Service (DDS) Adapter. **Field Installation:** Yes.

SUPPLIES

For IBM diskettes, see IBM.

5291 DISPLAY STATION MODEL 1

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT.

PURPOSE

The 5291 Model 1 Display Station is a member of the 5250 Information Display System and can be used with S/34, S/36, and S/38 for entering, editing and displaying alphanumeric data. A movable keyboard permits the operator to enter, display, and manipulate data on the screen in a highly flexible and efficient manner. This display station performs the same basic functions as the 5251 model 11, in a compact package with a low profile keyboard and a tiltable display screen. Displays up to 1,920 characters with 24 lines of 80 characters each. The display station status, including cursor location (row/column), is shown on the 25th line.

MODEL 1

Model 1 001

Prerequisites: A 5251 mdl 2 or 12 with #2550 or #2551, a 5294, or a 5340 (System/34 must be at SSP release 7 level or greater, and if the 5291 is to be used as a console, the System/34 must be at diagnostic release level 9.2 or greater), or a System/36, or 5381.

HIGHLIGHTS

The standard character set includes 96 characters: 52 upper/lower case alphabetic, 10 numeric, and 33 special characters in addition to "space". Cable-Thru is a standard capability. A Display Screen Glare Reduction Filter is also provided as a standard feature. See "Type Catalog" for keyboard layout. Display functions in addition to normal intensity are: high intensity, non-display, blinking, underscore, column separator, and reverse image (dark characters on a color background) on a field basis. The operator can reverse the image of the entire screen. An operator-adjustable audible alarm, under program control, is provided to alert the operator to special conditions. The low profile keyboard with adjustable slope and 24 application assigned command functions provides input and control flexibility.

Security Enhancements: Data fields can be defined allowing entered data to be accepted without being displayed on the screen.

Field Editing: Individual data input fields can be edited as Alphanumeric, Alpha Only, Numeric Only, Signed Numeric, Field Exit Required, Right Adjust, Mandatory Entry, Mandatory Fill, Bypass, Auto Enter, Dup Enable, Monocase and Self-Check Modulus 10 and 11.

Cabling: Display stations are attached to other display stations or a controller with either twinaxial cable or IBM shielded twisted pair cable (or equivalent). Twinaxial cable is required for attachment to the 5340 or 5251-2. Maximum length of any one cable is 1,525 meters (5,000 feet). Up to seven work stations may be attached to one cable via the Cable-Thru feature. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and 5252 devices require twinaxial cable. Refer to Accessories section for ordering information. See "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337) for cabling information.

Clustering: The 5291 may be attached to the 5294, or 5251 mdl 2 or 12 with the Cluster (#2550) or the Dual Cluster (#2551) feature. The Cluster feature allows attachment of up to four workstations and the Dual Cluster feature allows attachment of up to eight workstations.

Communications: The 5291 can communicate with a System/34, System/36, System/38 via a 5251 mdl 12, or a 5294 (the 5294 is not supported on the System/34 or System/38). The 5291 can also communicate with a System/34 or System/38 via a 5251 mdl 2. See M5251 pages for communicating capability of the mdl 2 or 12, or

M5294 pages for communicating capability of the workstation controller.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the "IBM 5291 Display Station Operator's Guide" (GA21-9409). Also, see "Customer Responsibilities" below.

Customer Setup (CSU): The 5291 is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5291.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM. Details of these conditions are described in the Customer Setup instructions.
- Relocation of the 5291, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5291 prior to calling for IBM service.
- Providing a desk or table-top to support the 5291.
- Installation and maintenance of signal cables between 5250 Information Display System components and the attached system.
- When adding additional direct or remote display stations to System/34, System/36, or System/38, the customer may have to modify the system configuration specifications. See "IBM System/34 Program Product Installation and Modification Reference Manual" (SC21-7689), "IBM System/36 Changing Your System Configuration" (SC21-9052), "IBM System/38 Guide to Program Product and Device Configuration" (GC21-7775).

Publications: "IBM 5250 Information Display System Introduction Manual" (GA21-9246), "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337), "IBM 5291 Display Station Operator's Guide" (GA21-9409), and "IBM 5291 Set-up Procedures" (GA21-9408) (shipped with the product).

SPECIFY

- Default Order Entry: Specify Codes may not be required when ordering a 5291. If other codes are not specified, appropriate defaults will be assumed based on the 3-digit country code. Default parameters are shown below.
- Voltage Defaults (AC, 1-phase, 50/60 Hz):

200-240V	100-127V
Argentina	Brazil
Australia	Canada
Colombia	
Japan	
Mexico	
Venezuela	

Note: If the default voltage is not desired, or if a default is not listed for your country, specify desired voltage (AC, 1-phase) from the following:

50 Hz

60 Hz

100V-127V	#0803	100V-127V	#0804
200V-240V	#0805	200V-240V	#0806

- Power Cord Default: The most commonly used plug for each country, as shown in the "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337), will be shipped with the machine.

For Canada and Japan, a standard non-locking plug will be supplied.

If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a power cord without a plug.

- Color Default: Pearl White only.
- Cables: See "Accessories" for 5291 mdl 1 cable references and ordering instructions. For cable specifications, see the "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337).
- Language Group Defaults: Includes nomenclature, keyboard graphics, and display screen graphics. See "Type Catalog" for keyboard nomenclature.

Note: The 5291 mdl 1 must specify the same Language Group as used on the 5251 mdl 2 or 12 to which it is attached. The Multinational Character Set is not available on the 5291.

Argentina	Spanish Speaking	#2961
Australia	English US	#2956
Brazil	Brazilian	#2975
Canada	English US	#2956
Colombia	Spanish Speaking	#2961
Japan	Japanese Katakana	#2973
Mexico	Spanish Speaking	#2961
Venezuela	Spanish Speaking	#2961

If exceptions to these language group defaults are desired, or if none is listed for your country, specify from the following list:

Brazilian	#2975
Canadian French	#2977
English US EBCDIC	#2956
International	#2950
Japanese English	#2955
Japanese Katakana	#2973
Spanish Speaking	#2961

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for direct product attachment. Twinaxial cable is required for attachment to the 5251-1, 5251-2, and the 5252. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-pair Cable - For proper identification, installation, and application of cable and associated accessories, refer to "IBM Cabling System - Planning and Installation Guide" (GA27-3361). For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable - For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide" (GA21-9337). When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. This is an indoor/outdoor cable.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial wire and one Twinaxial Connector Kit are required for each attachment cable. Individual connectors P/N 7362269 are available for replacement.

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 3762230): Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector Kit (B/M 7361807): Two protectors. One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes.

SUPPLIES (NONE)

MACHINES

5291 DISPLAY STATION MDL 2
PURPOSE

The 5291 model 2 Display Station is a member of the 5250 Information Display System and can be used with S/34, S/36, and S/38 for entering, editing and displaying alphanumeric data. A pluggable, movable keyboard permits the operator to enter, display, and manipulate data on the screen in a highly flexible and efficient manner. This display station performs the same basic functions as the 5251 model 11, in a compact package with a low-profile keyboard and a rotatable and tiltable display screen. Displays up to 1,920 characters with 24 lines of 80 characters each. The display station status, including cursor location (row/column), is shown on the 25th line.

MODELS
Model 2 20X

The language option will be designated by the third character of the AAS model number as follows:

20D	Canadian French
20K	Japanese Katakana
20S	Spanish Speaking
20Y	English US

Prerequisites: A 5251 mdl 2 or 12 with #2550 or #2551, a 5294, or a 5340 (S/34 must be at SSP release 7 level or greater, and if the 5291 is to be used as a console, the S/34 must be at diagnostic release level 9.2 or greater), or a S/36, or S/38.

HIGHLIGHTS

The standard character set includes 96 characters: 52 upper/lower case alphabetic, 10 numeric, and 33 special characters in addition to "space". Cable-Thru is a standard capability. A Display Screen Glare Reduction Filter is also provided as a standard feature. Separate brightness and contrast controls are provided. See "Type Catalog" for 5291 keyboard layout. Display functions in addition to normal intensity are: High-intensity, nondisplay, blinking, underscore, column separator, and reverse image (dark characters on a color background) on a field basis. The operator can reverse the image of the entire screen. An operator-adjustable audible alarm, under program control, is provided to alert the operator to special conditions. The low-profile keyboard with adjustable slope and 24 application assigned command functions provides input and control flexibility. The 5291 mdl 2 has identical function to and is configured as a 5291 mdl 1.

Security Enhancements: Data fields can be defined allowing entered data to be accepted without being displayed on the screen.

Field Editing: Individual data input fields can be edited as Alphanumeric, Alpha Only, Numeric Only, Signed Numeric, Field Exit Required, Right Adjust, Mandatory Entry, Mandatory Fill, Bypass, Auto Enter, Dup Enable, Monocase, and Self-Check Modulus 10 and 11.

Cabling: The cable attachment between the 5291 and other 5250 system components and/or systems must be made with twinaxial cable. Cable connection: Maximum length of any one twinaxial cable is 1,525m (5,000 feet). Up to seven workstations may be attached to a twinaxial cable via the Cable-Thru capability of the 5291. See *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337) for cabling information.

Clustering: The 5291 may be attached to the 5251 mdl 2 or 12 with the Cluster (#2550) or the Dual Cluster (#2551) feature. The Cluster feature allows attachment of up to four workstations and the Dual Cluster feature allows attachment of up to eight workstations.

Communications: The 5291 can communicate with a S/34, S/36, S/38 via a 5251 mdl 12, to the S/36 or S/38 via a 5294; and with a S/34 or S/38 via a 5251 mdl 2 or 12. See M5251 pages for communicating capability of the mdl 2 or 12, or M5294 pages for 5294 capability.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the *IBM 5291 Models 1 and 2 Display Station Operator's Guide* (GA21-9409). Also, see "Customer Responsibilities" below.

Customer Setup (CSU): The 5291 is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5291.

- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM. Details of these conditions are described in the Customer Setup instructions.
- Relocation of the 5291, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5291 prior to calling for IBM service.
- Providing a desk or table-top to support the 5291.
- Installation and maintenance of signal cables and associated parts between 5250 Information Display System components and/or the attached system.
- When adding additional direct or remote display stations to S/34, S/36, or S/38, the customer may have to modify the system configuration specifications. See *IBM System/34 Program Product Installation and Modification Reference Manual* (SC21-7689), *IBM System/36 Changing Your System Configuration* (SC21-9052), *IBM System/38 Guide to Program Product and Device Configuration* (GC21-7775).

Publications: *IBM 5250 Information Display System Introduction Manual* (GA21-9246), *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337), *IBM 5291 Models 1 and 2 Display Station Operator's Guide* (GA21-9409), and *IBM 5291 Model 2 Setup Procedure* (GA21-9802) (shipped with the product).

SPECIFY

- Order Entry: Specify Codes may not be required when ordering a 5291-2. If other codes are not specified, appropriate defaults will be assumed based on the 3-digit country code. Default parameters are shown below.

- Voltage Defaults (AC, 50/60 Hz):

Argentina	#0801	200-240V
Australia	#0801	200-240V
Canada	#0802	100-127V
Colombia	#0802	100-127V
Japan	#0802	100-127V
Mexico	#0802	100-127V
Venezuela	#0802	100-127V

Note: If the default voltage is not desired, or if a default is not listed for your country, specify desired voltage (AC, 1-phase) from the following:

100V-127V #0802
200-240V #0801

- Power Cord Default: The power cord is 3.0m (9.8 feet) long. The most commonly used plug for each country as shown in the *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337), will be shipped with the machine.

For Canada and Japan, a standard nonlocking plug will be supplied.

If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a power cord without a plug.

- Color Default: Shell gray only. No specify code required.
- Cables: See "Accessories" for twinaxial cable and associated components and ordering instructions.
- RPQs: The following RPQs may be applicable. The 5291 mdl 2 with Spanish Speaking keyboard is supported via the following control unit/processor RPQs:

	Plant	Field
5294	RPQ 8D0194	---
S/36-5360 (Release 2)	RPQ 8D0255	RPQ 8D0195
S/36-5362 (Release 2)	RPQ 8D0204	---
S/36-5381 (Release 6)	RPQ 8D0196	RPQ 8D0256

The 5291 mdl 2 with Spanish Speaking is compatible with the 3180 mdl 2 with Spanish Speaking. The 5291 mdl 1 with Spanish Speaking must be modified via RPQ 8D0199 to be compatible with the 5291 mdl 2 with Spanish Speaking. The 5251 mdls 11 and 12 and 5292 are not compatible.

MODEL CONVERSIONS (None)

5291 Display Station Mdl 2 (cont'd)
ACCESSORIES

T-Connector and Associated Components: A T-connector is available for the 5291 mdl 2 that allows the machine to be disconnected from the twinaxial loop without disrupting the other devices on the loop or the host. The T-connector, that must be attached directly to the 5291 mdl 2, provides two ports for attachment of the normal twinaxial (Cable-Thru) cables. When a T-connector is disconnected from the machine, the terminal connecting port of the T-connector should be sealed with a dust cap to prevent accidental contamination of the twinaxial line. If the T-connector is used at the last device in a twinaxial loop, it is necessary to install a terminator cap on the unused port of the T-connector. For use of the T-connector on other 5250 Information Display System components, see RPQ 841529. **Field Installation:** The T-connector, dust cap, and terminator cap are customer-owned accessories and customer setup components and are available for field installation only. **Customer Setup:** Yes, CSU only. **Ordering Instructions:** These accessories may be ordered by part number for field installation.

Item	P/N
T-Connector	4178269
Dust Cap	4178270
Terminator Cap	7362188

Extension Cables (P/N 7361796): Provide a 0.6m (2 feet) video extension cable [total 1.2m (4 feet) with the 0.6m (2 foot) standard video cable] and a 0.5m (1.6 foot) keyboard extension cable [total 1.6m (5.3 feet) with the 1.1m (3.7 foot) standard keyboard cable]. With these accessory cables, the logic unit can be located away from the video unit and the keyboard. **Customer Setup:** Yes. **Ordering Instructions:** Order via MES from NDD, Dayton, NJ.

Logic Unit Mounting Bracket (P/N 5641652): Provides a mounting bracket to mount the logic unit on a vertical surface such as the side of a desk or a wall when the logic unit is placed away from the video unit and keyboard using extension cables accessory. Arrangements for mounting the bracket is the customer's responsibility. This is a 3178 bracket and is interchangeable with the 5291-2. **Ordering Instructions:** Order from IBM.

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for product attachment. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for the installation and maintenance of these cables and their associated accessories.

Twisted-Pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to *IBM Cabling System - Planning and Installation Guide* (GA27-3361). For pricing and ordering information, refer to the Systems Supplies operation within your country.

Twinaxial Cable: For proper identification, installation, and application of cable and associated accessories, refer to *IBM 5250 Information Display System Planning and Site Preparation Guide* (GA21-9337).

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. This is an indoor/outdoor cable.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial wire and one Twinaxial Connector Kit are required for each attachment cable. Individual connectors P/N 7362269 are available for replacement.

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector Kit (B/M 7361807): Two protectors. One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes.

SUPPLIES (None)

5292 COLOR DISPLAY STATION**PURPOSE**

The 5292 is an advanced color display station for use in 5250 Information Display System networks. It is attachable to S/34, S/36, S/38, and 5251 mdl 2 or 12, or 5294.

MODELS

Model 1: (NO LONGER AVAILABLE) The 5292 mdl 1 is a 7-color display station plug compatible in 5250 Information Display System networks. It can be used with S/34, S/36, and S/38 for entering, editing and displaying alphanumeric data. Displayable colors are red, green, turquoise, yellow, pink, blue and white. A low profile, typewriter-style movable keyboard permits the operator to enter, display, and manipulate data on the screen in a highly flexible and efficient manner. This display station performs the same basic functions as the 5251 mdl 11, but utilizes a color display screen. Displays up to 1,920 characters with 24 lines of 80 characters each. The display station status is shown on a 25th line. Optionally, the user can also display the cursor location (row/column) on this status line.

Model 2: (NO LONGER AVAILABLE) In addition to being able to operate exactly like a mdl 1 in alphanumeric mode (described above), the 5292 mdl 2 provides the capability of producing business graphics utilizing up to eight colors (black plus seven from a palette of 512 colors — requires host system programming support). Examples of graphic images which can be displayed include bar charts, pie charts, line graphs, and surface graphs. High flexibility in creating graphic images is achieved by the inclusion of an All-Points-Addressable (APA) display and a customized vector-to-raster conversion processor. Also included in the mdl 2 are three standard output ports: IEEE 488 (requires host system programming support), parallel printer (requires PRQ for 5292 mdl 2 microcode support), and video. These ports allow the direct attachment of various plotters, printers, and electronic film cameras, monitors, or projectors.

Prerequisites: A 5251 mdl 2 or 12 with Cluster (#2550) feature or Dual Cluster (#2551) feature, 5294, or a 5340 (S/34 must be at SSP release 7 level or greater), S/36, or a 5381 (Release 4.1 or higher). For the mdl 2, programming graphics support is provided on S/36 via S/36 Business Graphics Utilities, 5799-BNW (PRPQ P84056). The 5292 mdl 2 will attach to the S/34 and S/38 and operate as a mdl 1 but graphics programming support is not available. An RPQ is required to provide the microcode to support a parallel printer attachment to the 5292 mdl 2.

HIGHLIGHTS

Mdls 1 and 2 Alphanumeric Mode: The standard character set includes 96 dot-matrix characters: 52 upper/lower case alphabetic, 10 numeric, and 33 special characters in addition to "space". The display of colors is achieved through the use of already existing attribute codes and can be used without program modification. (For example, the high intensity attribute code will result in white color; the blink attribute code will result in red color, etc.) For optimum use of color, changes may be desired in existing programming support for the customer 5251 or 5252 Display Stations. See "IBM 5292 Color Display Station Programmer's Guide to Using Color", (GA21-9413). Cable-Thru and Screen Glare Reduction are provided as standard features. 188-character Multinational Character Set is available: providing 112 alphabetic, 10 numeric, and 66 special displayable characters in addition to "space". See "Type Catalog" for keyboard layout. Display functions include: nondisplay, blinking, underscore, column separator, and reverse image (dark characters on a color background) on a field basis. An operator-adjustable audible alarm is provided to alert the operator to special conditions. The low profile keyboard with adjustable slope and 24 application assigned command functions provides in-

put and control flexibility. Easy-to-use select options, provided from the keyboard, allow the operator to utilize a block or underscore cursor, cursor blink or non-blink, limit line space and limited use of color. The operator can also elect to display the cursor location (row/column) and the screen attribute codes being utilized as well as set the audible alarm volume.

Mdl 2 in Graphics Mode: Inclusion of the vector-to-raster conversion processor provides for host offload, area fill of complex shapes, flexible for line styles, and double width line generation. The All-Points-Addressable (APA) capability gives access to 480 addressable points in the horizontal direction by 288 points in the vertical direction utilizing eight colors (black plus seven colors from a palette of 512 colors). Color selection is a function of host system graphics software support. Three output ports are provided on the mdl 2: The IEEE output port provides port attachment of various plotters (requires host system programming support), the parallel printer output port allows attachment of various mono/color printers for screen copy (requires RPQ for 5292 mdl 2 microcode support) the video output port provides RGB (red, green, blue) plus synchronization signals to provide for attachment of various electronic film cameras, monitors, or projectors (host programming support is not required). Also provided on the mdl 2 when used in graphics mode are additional operator controls including graphics on/off, erase graphics display, terminate graphics processing, and screen copy (local hard copy via the parallel printer port). When in graphics mode the mdl 2 utilizes reduced line space.

Security Enhancements: Data fields can be defined so entered data is accepted without being displayed on the screen.

Field Editing: Individual data input fields can be edited as Alphanumeric, Alpha Only, Numeric Only, Signed Numeric, Field Exit Required, Right Adjust, Mandatory Entry, Mandatory Fill, Bypass, Auto Enter, Dup Enable, Monocase and Self-Check Modulus 10 and 11.

Cabling: Display stations are attached to other display stations or a controller with either twinaxial cable or IBM shielded twisted-pair cable (or equivalent). Twinaxial cable is required for attachment to the 5251-2. Maximum length of any one cable is 1,525m (5,000 ft). Up to seven workstations may be attached to one cable via the Cable-Thru feature. All cable-thru devices on a single cable must use the same cable type. The 5251-1 and the 5252 devices require twinaxial cable. See "Accessories" section for ordering information.

Clustering: The 5292 Color Display Station may be attached to the 5251 mdl 2 or 12 with the Cluster (#2550) or the Dual Cluster (#2551) feature, or the 5294. The Cluster feature allows attachment of up to four workstations and the Dual Cluster feature allows attachment of up to eight workstations. See "Special Features" in M5251 pages.

Communications: The 5292 Color Display Station can communicate with a S/34, S/36, S/38 via a 5251 mdl 12, or 5294 (the 5294 is not supported on the S/34). The 5292 can also communicate with a S/34 or S/38 via a 5251 mdl 2. See M5251 pages for communicating capability of the mdl 2 or 12, or M5294 pages for communicating capability of the workstation controller.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the "IBM 5292 Color Display Station Color Alignment and Problem Determination Procedures", (GA21-9420), which is shipped with the machine. Also, see "Customer Responsibilities" below.

Customer Setup (CSU): The 5292 Color Display Station is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine. The CSU allowance is one day.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5292.
- Physical setup, connection of cables to IBM devices incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM. Details of these conditions are described in the Customer Setup instructions.
- Relocation of the 5292, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5292 prior to calling for IBM service.
- Providing a desk or table-top to support the 5292.
- Installation and maintenance of signal cables between 5250 Information Display System components and the attached system. The customer is also responsible for providing and installing cables from any of the output ports of the mdl 2 to the output device if not supplied with the device.
- When adding display stations to S/34, S/36, or S/38, the customer may have to modify the system configuration specifications. See "IBM System/34 Program Product Installation and Modification Reference Manual, (SC21-7689), "IBM System/36 Changing Your System Configuration, (SC21-9052), or "IBM System/38 Guide to Program Product and Device Configuration", (GC21-7775).

Publications

- "IBM 5250 Information Display System Introduction Manual", (GA21-9246)
- "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337)
- "IBM 5292 Color Display Station Operator's Guide", (GA21-9416)
- "IBM 5292 Color Display Station Programmer's Guide to Using Color", (GA21-9413)
- "IBM 5292 Color Display Station Color Alignment and Problem Determination Procedures", (GA21-9420)
- "The IBM 5250 Functions Reference Manual", (SA21-9247), contains mdl 2 output port interface description.

SPECIFY

- Default Order Entry: Specify Codes may not be required when ordering a 5292. If other codes are not specified, appropriate defaults will be assumed based on the 3-digit country code.
- Voltage Defaults (AC, 50/60 Hz):

100-127V	200-240V
Brazil #0802	Argentina #0801
Canada #0802	Australia #0801
Colombia #0802	
Japan #0802	
Mexico #0802	
Venezuela #0802	

Note: If the default voltage is not desired, or if a default is not listed for your country, specify desired voltage from the following:

#0802	100-127V
#0801	200-240V

- Power Cord Default: The most commonly used plug for each country as shown in the "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337), will be shipped with the machine.
- For Canada and Japan, standard nonlocking plugs will be supplied.

If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a 50 Hz power cord without a plug or #2746 for a 60 Hz power cord without a plug.

- Color Default: Pearl White only.
- Cables: See "Accessories". For cable specifications, see the "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337).
- Language Group Defaults: Includes nomenclature, keyboard graphics, and display screen graphics. See "Type Catalog" for keyboard nomenclature.

Note: The 5292 must specify the same Language Group as used on the 5251 mdl 2 or 12 to which it is attached.

Argentina	Spanish Speaking	#2961
Australia	English US	#2956
Brazil	Brazilian	#2975
Canada	English US	#2956
Colombia	Spanish Speaking	#2961
Japan	Japanese Katakana	#2973
Mexico	Spanish Speaking	#2961
Venezuela	Spanish Speaking	#2961

If exceptions to these language group defaults are desired, or if none is listed for your country, specify from the following list:

Brazilian #2975	Jap. Eng. #2955
Canadian French #2977	Japanese Katakana #2973
English US EBCDIC #2956	Spanish Speaking #2961
International #2950	

- Character Set: The 96-character EBCDIC character set is provided as standard. If the 188-character Multinational Character Set is desired, specify #2990. The keyboards do not include the additional characters of the Multinational Character Set. All characters may be entered via a single or multiple key sequence. Multinational Control (#2990) is required on the 5340. Workstation Control Expansion (#4900) is required on the 5360. All workstations attached to a S/34 or S/36 must have the same character set. The Multinational Character Set does not include Katakana characters.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for product attachment. Twinaxial cable is required for attachment to the 5251 Mdl 2 or 12, 5294, S/34, S/36, or S/38. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM Cabling System-Planning and Installation Guide", (GA27-3361). For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide", (GA21-9337). When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Individual connectors P/N 7362229 are available for replacement.)

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (This is an indoor/outdoor cable.)

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire

must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cables Assemblies to be joined together.

Twinaxial Station Protector Kit (B/M 7361807): Two protectors. One is required at each end of each Twinaxial Attachment Cable installed outdoors (either above or below ground level). Individual Twinaxial Station Protectors, P/N 7362426, are available for replacement purposes.

SUPPLIES (NONE)

5294 REMOTE CONTROL UNIT MODEL 1

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

PURPOSE

The 5294 is a remote control unit for the following workstations: 3179 mdl 2(Canada only> (except Mdl 220)<), 3180 mdl 2, 3196, 3197 mdls C and D, 3812 (with #3015), 4224 mdls 101, 102, 1C2, and 1E2 (with #3601 required on the 5294), 4234 mdl 2, 5251 mdls 11 and 999, 5291, 5292, 5219 mdls D01 and D02, 5224, 3812, 5225, 5256, 5262-001 printers, 5550 ideographic workstation, (Canada only> and the Personal Computer (with 5251 mdl 11 emulation only).<)

MODEL 001

Model 001

Prerequisites: Transmission via (Canada only> common carrier<) (Except Canada> PTT<) facility to a 5360 or 5381 with a communications adapter, requires a modem/DCE and the appropriate interface feature or a DDS adapter. See "Special Features" for communications adapters. At least one display station with a keyboard installed within 6m (20 ft) of the 5294 mdl 1 is required for service of the 5294 mdl 1.

HIGHLIGHTS

The 5294 mdl 1 control unit is a remote workstation controller which can attach up to eight workstations consisting of (Canada only> the Personal Computer (with 5251-11 emulation feature)<) display stations, and printers.

The basic machine has two ports and allows attachment of up to four workstations. Using Cable-Thru, the workstations can be distributed in any combination on the two ports. The workstation may be installed up to a maximum of 1,525m (5,000 ft) from the 5294 mdl 1.

The 5294 mdl 1 communicates in SNA/SDLC half-duplex mode via half-duplex or duplex communication facilities. It features high-speed communications capability -- up to 56,000 bps via the DDS adapter and up to 48,000 bps via X.21 adapter.

The 5294 is customized (via a display station) during CSU utilizing battery powered memory in the 5294 to store the customized workstation configuration, character sets, features, and communication connection data. Detailed information for initial customizing and for customizing made necessary by changing configurations is contained in the "IBM 5250 Planning and Site Preparation Guide", GA21-9337, and the "IBM 5294 Remote Control Unit Setup Procedures", GA21-9369.

Cabling: See "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337 and "IBM Cabling System Planning and Installation Guide", GA27-3361 for cabling information.

Clustering: Additional workstations may be attached to the 5294 mdl 1 with Extended Cluster (#2550). This feature allows attachment of a total of eight workstations. See "Special Features".

Text Entry Assist: A set of text functions including word wrap, continuous text entry, tab entry and control, split screen format, and prompting. This feature is required to use the DisplayWrite/36 program via S/36 remote workstations (see "Special Features").

Communications: The 5294 mdl 1 communicates with a S/36 (using the IBM System/36 System Support Program, 5727-SS1 Release 2.0 or later, or 5727-SS6 Release 3.0 or later) and equipped with compatible communications adapters operating in SDLC X.21 switched or X.25 mode. The 5294 mdl 1 communicates with a S/38 (using the

IBM System/38 Control Program Facility, 5714-SS1 Release 7 or later) and with compatible communications adapters operating in an SDLC or X.25 modes. In SDLC mode, the 5294 communicates in half-duplex mode on nonswitched (leased) point-to-point and multi-point communication lines which may be duplex or half-duplex facilities (depending upon communication feature selected) at speeds up to 56,000 bps and on switched (dial) point-to-point communication lines at speeds up to 9600 bps as allowed by available facilities. In X.21 mode, SDLC communication is available on switched networks at speeds up to 48000 bps. In X.25 mode, the 5294 communicates in full-duplex mode on nonswitched (leased) point-to-point duplex facilities. See M2700 pages for information on communications facilities. Limitations: (Canada only> EIA<) (Except Canada> CCITT<) Interface (#3701) or (Except Canada> CCITT<) X.21 Adapter (#5655) is required.

Caution: Careful consideration must be given regarding language options between the 5294 and the host computer.

(Canada only> A 5294 must have feature #2977 (specify for French language) if it is to communicate with a System/36 that has multi-language support. If the host (System/36 or System/38) has a language specify of US English, then it does not matter what language specify is on the 5294. See the following chart:

5294		
CPU	French Canadian	US English
French Canadian	Must Match	Not Compatible
US English	Will Function	Will Function<

IBM Modems: One IBM modem may be attached to the 5294 mdl 1:

(Canada only> Modem	Speed (bps)<	
(Canada only> 3863	2400	
3864	4800	
3865	9600	
3868-1	2400	
3868-2	4800	
3868-3	9600	PTP
3868-4	9600	MP
3872	2400	
3874	4800	
3875	7200<	
(Except Canada> Modem	Speed (bps)	Facility
3863	2400	C3, D5
3872-1	2400	C3, D5
3864	4800	C4, D6
3865	9600	D8
3868-1	2400	D5
3868-2	4800	D6
3868-3	9600	PTP D8
3868-4	9600	MP D8
3874	4800	C4, D6
3875	7200	D7M<

Note: The 5294 mdl 1 does not support Autocall Originate (#1091) on the 3872. For communications capabilities, product utilization, and special features, see M2700, 3863, 3864, 3865, and 3872 pages. Prerequisites: #3701.

Data Encryption Devices: A 3845 or 3846 Data Encryption Device may be attached between the 5294 mdl 1 and the external modem.

Note: Refer to M2700, 3845, and 3846 pages for information on the 3845 or 3846 configuration and communications capability. Prerequisites: #3701.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the "IBM 5294 Operator's Guide and Problem Determination Procedures", GA21-9370. Also, see "Customer Responsibilities".

Customer Setup (CSU): The 5294 mdl 1 is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine. The CSU allowance is one day.

Customer Responsibilities: The customer is responsible for:

- Receipt, unpacking and placement of the 5294 mdl 1.
- Physical setup, connection of cables to TP lines/modems incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM. Details of these conditions are described in the Customer Setup instructions shipped with the product.
- Relocation of the 5294 mdl 1, if required, to allow IBM service access.
- Using and following the problem determination procedures for the 5294 mdl 1 prior to calling for IBM service.
- Providing a desk or table-top to support the 5294 mdl 1.
- Installation and maintenance of signal cables and associated parts for attaching the 5294 mdl 1.
- The installation and maintenance of (Canada only> common carrier<) (Except Canada> PTT<) facilities or services. For further information, see M2700 pages
- Obtaining a firm installation date for the start of transmission services (including any required modems). The IBM Marketing representative must assure that a firm installation date is established prior to order confirmation.

Publications

- GA21-9370 IBM 5294 Remote Control Unit Operator's Guide and Problem Determination Procedures
- GA21-9369 IBM 5294 Remote Control Unit Setup Procedures
- GA21-9337 IBM 5250 Information Display System Planning and Site Preparation Guide
- GA21-9246 IBM 5250 Information Display System Introduction
- GA21-9247 IBM 5250 Information Display System Functions Reference Manual

SPECIFY

- Default Order Entry: Specify Codes may not be required when ordering a 5294 mdl 1. If other codes are not specified, appropriate defaults will be assumed based on the 3-digit country code.

Note: Any desired special features and one communication feature must be ordered. (See "Special Features".) Default parameters are shown below.

- Voltage Defaults (AC, 50/60 Hz):

100-127V	200-240V
Brazil #0802	Argentina #0801
Canada #0802	Australia #0801
Colombia #0802	
Japan #0802	

Mexico #0802
Venezuela #0802

Note: If the default voltage is not desired, or if a default is not listed for your country, specify desired voltage from the following:

#0802 100-127V
#0801 200-240V

- Power Cord Default: The most commonly used plug for each country as shown in the "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337, will be shipped with the machine.

For Canada and Japan, standard nonlocking plugs will be supplied. If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a 50 Hz power cord without a plug or #2746 for a 60 Hz power cord without a plug.

- Color Default: Pearl white only. No specify code required.

- Language and Machine Nomenclature Defaults:

Argentina	Spanish	#2960
Australia	English US	#2956
Brazil	English US	#2956
Canada	English US	#2956
Colombia	Spanish	#2960
Japan	Japanese	
	Katakana	#2973
Mexico	Spanish	#2960
Venezuela	Spanish	#2960

If exceptions to these language group defaults are desired, or if none is listed for your country, specify from the following list:

Canadian French	#2977
English US EBCDIC	#2956
Japanese Katakana	#2973
Spanish	#2960

- Communication Cable: The appropriate 6m (20 ft) communication cable is provided as standard for the communication feature ordered. No specify code required.

SPECIAL FEATURES

Non-Communications Features

Extended Cluster (#2550): Provides two additional cable connections. Allows attachment of up to eight workstations: (3179 mdl 2(Canada only> (except 3179-220)<); 3180 mdl 2; 3196, 3197 mdls C and D, 3812 (with #3015); 4224 mdls 101, 102, 1C2, and 1E2 (with #3601 required on the 5294); 4234 mdl 2; 5219 mdl D01 or D02; 5224; 5225; 3180 mdl 2; 5251 mdls 11 and 999; 5256; 5262-001; 5291; (Canada only> 5292; or Personal Computer.<) The maximum allowable length of cable on each port is 1,525m (5,000 ft). To attach multiple workstations to one cable, see Cable-Thru (#2680) for the 5225, 5251 mdls 11 and 999, and 5256. Limitations: If X.25 Support Feature (#5680) is installed, the maximum number of workstations that can be attached is six. Maximum: One. Field Installation: Yes.

Expanded Function (#3600) (No Longer Available): Provides the following functions:

- Copy provides for the direct transfer of screen character images from the 5251-11, 5291, 5292, 3197 mdls C and D, 3179 mdl 2 (Canada only> (except 3179-220)<) or 3180-2 to a printer attached to the 5294. Selection and allocation of the printer is controlled by the host S/38. Copy from workstations in ideographic mode is not supported.
- Magnetic Stripe Reader control provides control for Magnetic Stripe Reader (#4910) on the attached 5251 mdl 11 (or magnetic slot reader control, RPQ 841500 - on the attached 5292).
- Self-Check Number provides Modulo 10 and 11 checking to assure that all digits of a number have been correctly keyed

from the attached 3197, 3179 mdl 2(Canada only > (3179-220) <), 3180-2, 5251, 5291, or 5292 keyboards.

Field Installation: Yes. Prerequisites: #3610 must be installed.

Extended Function A (#3601): Copy function (S/38 only) provides for the direct transfer of screen character images from the 3179-2(Canada only > (except 3179-220) <), 3180-2, 3196, 3197 mdls C and D, 5251-11, 5291, or 5292 to a printer attached to the 5294-001. Selection and allocation of the printer is controlled by the host S/38. Copy from workstations in ideographic mode is not supported.

Magnetic Stripe Reader Control provides control for the Magnetic Stripe Reader (#4910) on the attached 5251 mdl 11 (or Magnetic Slot Reader Control, RPO 841500 - on the attached 5292). Self Check Number provides Modulus 10 or 11 checking to assure that all digits of a number have been correctly keyed from the attached 3179-2(Canada only > (except 3179-220) <), 3180-2, 3196 mdl A10, B10, 3197 mdls C and D, 5251-11, 5291 or 5292 keyboards. Support for the 4224 Printer (mdls 101, 102, 1C2, or 1E2) remotely attached to the S/36 (with 5727-SS1 or 5727-SS6 Release 4.0 or later), or remotely attached to the S/38 (with 5714-SS1 Release 8.0 or later). Support for #6080 of the IBM System/36 System Support Program, 5727-SS1 Release 4.0 or later. Support for #6091 of the IBM System/36 System Support Program, 5727-SS6 Release 4.0 or later. Support for the performance enhancements announced in Release 4.0 of the IBM PC Support/36 Licensed Program (5727-WS1 and 5727-WS6). Limitations: Extended Function A is mutually exclusive with Expanded Function (#3600). 3196, 3197 mdls C and D (see M3196 or M3197 pages for Prerequisites). Prerequisites: The 4224 Printer support is designed to operate with the IBM System/36 System Support Licensed Program (5727-SS1 or 5727-SS6) Release 4.0 and later, and with the IBM System/38 Control Program Facility Licensed Program (5714-SS1) Release 8.0 or later. Support for #6080 of the IBM System/36 System Support Licensed Program (5727-SS1) requires 5727-SS1 Release 4.0 or later. Support for #6091 of the IBM System/36 System Support Licensed Program (5727-SS6) requires 5727-SS6 Release 4.0 or later. Support for the PC Support/36 performance enhancements require the IBM PC Support/36 Licensed Program (5727-WS1 or 5727-WS6, Release 4.0 or later), and the associated IBM System/36 System Support Licensed Program (5727-SS1 or 5727-SS6) Release 4.0 or later. Feature Adapter Card (#3610) and/or Feature Adapter Card "A" (#3611) must be installed and have space available for this feature (see the descriptions of #3610 and #3611 for details). Field Installation: Yes. (Field installation of #3601 may also require the concurrent removal of #3600. RPO S30289, "FC3600 Removal Record Purposes Only", should be ordered with #3601.)

Feature Adapter Card (#3610): (No longer available -- see #3611). This adapter provides the necessary card space within the 5294 to install Expanded Function (#3600), Extended Function A (#3601), Text Entry Assist (#3620) X.21 Switched Support (#5656) or the X.25 Support Feature (#5680). Prerequisites: #3610 is a prerequisite to any of these features but should be ordered only once, even if more than one of these features are installed. Maximum: One. Field Installation: Yes.

Feature Adapter Card "A" (#3611): This feature is an enhanced version of Feature Adapter Card (#3610) and can be used as a replacement for Feature Adapter Card #3610. Because of the enhancements, #3610 cannot be used as a replacement for #3611. Feature Adapter Card "A" (#3611) provides the necessary card space within the 5294 to install such features as (either Expanded Function #3600 or Extended Function "A" #3601), Text Entry Assist #3620, Enhanced Keyboard Support #3630, X.21 Switched Support #5656, or X.25 Support Feature #5680. Each Feature Adapter Card "A" can provide card space for up to four features. If more than four features are needed, then two Feature Adapter Card "A"s (#3611) or one Feature Adapter Card (#3610) and one Feature Adapter Card "A" (#3611) would be required (see Feature Adapter Card #3610 description for its associated features). Note: Text Entry Assist (#3620) requires two feature positions. Maximum: One if #3610 is installed or two if #3610 is not installed. Field Installation: Yes.

Text Entry Assist (#3620): Allows DisplayWriter/36 to be used from remote workstations attached to the 5294. Text Entry Assist provides a set of text functions including word wrap, continuous text entry, and tabs that complement the DisplayWriter/36 host-based

text editor (see 5727-WP1 IBM System/36 DisplayWriter/36 licensed program). Prerequisites: Feature Adapter Card (#3610) and/or Feature Adapter Card "A" (#3611) must be installed and have two feature positions available for this feature (see the descriptions of #3610 and #3611 for details). 5727-WP1 IBM System/36 DisplayWriter/36 licensed program must be installed on the host system. Limitations: This feature does not support attached workstations with the IBM Enhanced Keyboards (see the Enhanced Keyboard Support Feature (#3630) "Limitations" for details). Field Installation: Yes.

Enhanced Keyboard Support (#3630): This feature provides support for attached (5294 supported) work stations that have the 102-key IBM Enhanced Keyboard. These workstations include the 3179-220, 3196-A20, and 3196-B20. Prerequisites: (1) Feature Adapter Card "A" (#3611) is required on the 5294. (2) The host IBM System/36 requires the IBM System/36 System Support Program (5727-SS1 or 5727-SS6, Release 5.0 or later). The host IBM System/38 requires the IBM System/38 Control Program Facility (5714-SS1, Release 8.0 or later). Field Installation: Yes. Limitations: (1) Cannot use the card space provided by Feature Adapter Card (#3610). (2) The Enhanced Keyboard Support Feature (#3630) will not allow attached workstations with the IBM Enhanced Keyboards to access the functions of the Text Entry Assist Feature (#3620). This means the IBM Enhanced Keyboard Support Feature (#3630) will not allow attached workstations with the IBM Enhanced Keyboards to use DisplayWrite/36 or Personal Services/36.

Communications Features

(Canada only > EIA <)(Except Canada > CCITT <) Interface (#3701): Provides an interface for attachment of an IBM modem or (Canada only > non-IBM modem meeting RS-232-C <)(Except Canada > PTT mandatory service or other non-IBM modems meeting CCITT V.24/V.28 <) characteristics. Non-IBM modems (other than PTT mandatory modems may be attached subject to the Multiple Supplier Systems Policy. This feature can also be used for attachment to X.21 public data networks that use a DCE providing an X.21bis interface. An integrated adapter for nonswitched point-to-point, multipoint, and switched point-to-point data transmission at speeds of 2400, 4800, 9600, 14,400, and 19,200 bps. A 6m (20 ft) EIA RS-232-C interface cable is provided with this feature. Limitations: Cannot be installed with X.21 Adapter (#5655). Maximum: One. Field Installation: Yes.

EIA/CCITT Adapter Cable (#4700): An 18-inch adapter cable is available if a modem eliminator or a limited distance modem is to be used with feature #3701. (In Brazil, this cable is shipped with the machine if Interface #3701 is ordered.) Can also be ordered by P/N 2452096 (see "Accessories").

X.21 Adapter (#5655): This feature provides an interface for connecting to a DCE which has an interface that complies with CCITT recommendation X.21 and X.24/X.27 for electrical characteristics and interface pin assignments. This feature may be used with the 5294 for SDLC communication over nonswitched public data network facilities and may also be used with #5656 for attachment to X.21 switched public data network facilities. It provides point-to-point data transmission speeds of 2400, 4800, 9600, or 48,000 bps. Refer to Chart L (switched) or Chart N (Nonswitched) in the M2700 pages for the networks and data circuit-terminating equipment (DCE) that are supported. The network establishes the data rate and supplies the clock. Usage of this feature on an X.21 network is dependent on the availability of an X.21 network that is compatible with IBM's implementation of X.21 as described in the "IBM Implementation of X.21 General Information Manual", GA27-3287. This feature may also be used with #5680 for attachment to those X.25 Packet Switched Networks which use an interface that complies with CCITT recommendation X.21 and X.24/X.27 for electrical characteristics and interface pin assignments. Refer to Chart Q in the M2700 pages for the networks and DCEs supported. The 5294 can communicate via the X.21bis interface to a S/36 and S/38. In this method of attachment, the 5294 uses the (Canada only > EIA RS-232-C <)(Except Canada > CCITT V.24/V.28 <) interface. Also, the 5294 can communicate via the X.21 Adapter with a S/36 and S/38 that has an X.21bis interface. Refer to Chart M (X.21 nonswitched) in the M2700 pages for information on the X.21 facilities. Limitations: Cannot be installed with (Canada only > EIA <)

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(Except Canada > CCITT <) Interface (#3701). Maximum: One. Field Installation: Yes.

X.21 Switched Support (#5656): Provides the support for attaching the 5294 to X.21 switched networks. #5656 supports SDLC communication over X.21 switched network facilities. It provides the protocol for X.21 switched communications. The usage of this feature is dependent on the availability of an X.21 network that is compatible with IBM's implementation of X.21 as described in the "IBM Implementation of X.21 General Information Manual", GA27-3287. Many X.21 switched network subscription options are supported. See the "5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for details. Prerequisites: (1) X.21 Adapter (#5655) must be installed, and (2) Feature Adapter Card (#3610) and/or Feature Adapter Card "A" (#3611) must be installed and have space available for this feature (see the descriptions of #3610 and #3611 for details). Limitations: Cannot be installed with X.25 support Feature (#5680). Maximum: One. Field Installation: Yes.

X.25 Support Feature (#5680): Provides the support for attaching the 5294 to the X.25 packet switching networks. It provides the HDLC protocol for X.25 communications. The installation of this feature is dependent on the availability of a Packet Switching Network that is compatible with IBM's implementation of X.25 as described in "IBM Implementation of X.25 General Information Manual", GA27-3345. Prerequisites: (1) Either #3701 or #5655 must be installed. (2) Feature Adapter Card (#3610) and/or Feature Adapter Card "A" (#3611) must be installed and have space available for this feature (see the descriptions of #3610 and #3611 for details). Limitations: Cannot be installed with X.21 Switched Support feature (#5656). Field Installation: Yes.

MODEL CONVERSIONS (NONE)**ACCESSORIES**

(Canada only > EIA <)(Except Canada > CCITT <) Adapter Cable: An 18-inch adapter cable is available in all countries if a modem eliminator is to be used with interface #3701. Order specifying P/N 2452096. In Brazil, this cable is shipped with the machine if interface #3701 is ordered.

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for product attachment. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-Pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation, and application of cable and associated accessories, refer to "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337. If cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Cabling: Twinaxial Connector Kit: Kit includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. Individual connectors are available for replacement. Order as follows:

P/N 7362268 Connector kit for vinyl-covered cables.

P/N 7362229 Individual connector (replacement) for vinyl-covered cables.

Twinaxial Wire: Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. (Vinyl-covered cable is an indoor/outdoor cable.) Order as follows:

P/N 7362211 for vinyl-covered cable

Twinaxial Cable Assembly: Includes two connectors attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly. Order as follows:

P/N 7362267 Cable assembly with vinyl-coated wire.

Twinaxial Adapter (P/N 3762230): Permits two Twinaxial Cable Assemblies to be joined together.

SUPPLIES (NONE)

(Except Canada > 5294 REMOTE CONTROL UNIT MODEL K01

PURPOSE

The 5294 mdl K01 is a remote control unit for the following workstations: 5555-B, 5553-B01, 5225-11, 5225-12, and 5224-12 ideographic workstations; 3179 (mdl 2), 3180-2, 3196 (mdl A1X, B1X) 3197 (mdl C1X, D1X), 5251 (mdl 11 and 999), 5291, and 5292 display stations; and 5219 (mdl D01 and D02), 5224, 5225, and 5256 printers. The 5294 mdl K01 provides communication capability with S/36 and S/38 using SNA in conjunction with SDLC. Model K01 can control up to four workstations and optional features allow up to eight workstations to be attached.

MODEL K01

Model K01

Prerequisites: Transmission via PTT facility to a S/38 with a communications adapter, requires a modem and the appropriate interface feature. See "Special Features" for communications adapters. At least one display station with a keyboard installed within 6m (20 ft) of the 5294-K01 is required for customer setup of the 5294.

Customer Setup (CSU): The 5294 mdl K01 is designated as a customer setup device, thereby offering the customer early availability and relocation flexibility. The Marketing Representative must advise the customer of his responsibilities before receipt of the machine. The CSU allowance is one day.

HIGHLIGHTS

The 5294-K01 control unit is a remote workstation controller which can attach up to eight workstations consisting of display stations, printers, and ideographic workstations.

The basic machine has two ports and allows attachment of up to four workstations. Using Cable-Thru, the workstations can be distributed in any combination on the two ports. The most remote workstation may be installed up to a maximum of 1,525m (5,000 ft) from the 5294-K01.

The 5294-K01 communicates in SNA/SDLC half-duplex mode via half-duplex or duplex communication facilities.

The 5294-K01 is customized (via a display station) during CSU utilizing battery powered memory in the mdl K01 to store the customized workstation configuration, character sets, features, and communication connection data. Detailed information for initial customizing and for customizing made necessary by changing configurations is contained in the "IBM 5294 Model K01 Ideographic Enhancements Guide", GA21-9500-0, and the "IBM 5294 Remote Control Unit Setup Procedures", GA21-9369.

Cabling: See "IBM 5294 Model K01 Ideographic Enhancements Guide", GA21-9500-0, for cabling information.

Clustering: Additional workstations may be attached to the 5294 mdl K01 with Extended Cluster (#2550). This feature allows attachment of up to eight workstations. See "Special Features".

Communications: The 5294 mdl K01 communicates with a S/36 or S/38 equipped with compatible communications adapters operating in SDLC or X.21 Switched mode. In SDLC mode, the mdl K01 communicates in half-duplex mode on nonswitched (leased) point-to-point and multipoint communication lines which may be duplex or half-duplex facilities at speeds up to 9600 bps and on switched (dial) point-to-point communication lines at speeds up to 9600 bps (as allowed by available facilities). In X.21 mode, SDLC communication is available on switched networks at speeds up to 48,000 bps. See M2700 pages for information on communications facilities.

The 5294 mdl K01 with an X.21bis interface (CCITT adapter) can communicate via X.21 facilities at speeds of 2400, 4800, and 9600 bps to a S/36 or S/38 with an X.21bis interface.

The 5294 mdl K01 with an X.21 native interface (new X.21 adapter) can communicate via X.21 leased facilities at speeds of 2400, 4800, and 9600 bps to a S/36 or S/38 with an X.21bis interface.

Limitations: Interface #3701.

IBM Modems: One IBM modem may be attached to the 5294 mdl K01:

Modem	Speed (bps)	Facility
3863	2400	C3, D5
3872-1	2400	C3, D5
3864	4800	C4, D6
3865	9600	D8
3868-1	2400	D5
3868-2	4800	D6
3868-3	9600	PTP D8
3868-4	9600	MP D8
3874	4800	C4, D6
3875	7200	D7M

Note: The 5294 mdl K01 does not support Autocall Originate (#1091) on the 3872. For communications capabilities, product utilization, and special features, see M2700, 3863, 3864, 3865, and 3872 pages. Prerequisites: #3701.

Data Encryption Devices: A 3845 or 3846 Data Encryption Device may be attached between the 5294 mdl K01 and the external modem.

Note: Refer to M2700, 3845, and 3846 pages for information on the 3845 or 3846 configuration and communications capability. Prerequisites: #3701. See "Special Features".

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer through the use of problem determination and recovery procedures that are easily understood and used by the operator. The procedures are provided in the "IBM 5294 Model K01 Ideographic Enhancements Guide", GA21-9500-0. Also, see "Customer Responsibilities".

Customer Responsibilities: The customer is responsible for:

1. Receipt, unpacking and placement of the 5294 mdl K01.
2. Physical setup, connection of cables to TP lines/modems and IBM devices, incorporating protected access areas, switch setting and checkout in accordance with instructions supplied by IBM. Details of these conditions are described in the Customer Setup instructions shipped with the product.
3. Relocation of the 5294 mdl K01, if required, to allow IBM service access.
4. Using and following the problem determination procedures for the 5294 mdl K01 prior to calling for IBM service.
5. Providing a desk or table-top to support the 5294 mdl K01.
6. Installation and maintenance of signal cables and associated parts for attaching the 5294 mdl K01.
7. The installation and maintenance of PTT facilities or services. For further information, see the M2700 pages.
8. Obtaining a firm installation date for the start of transmission services (including any required modems). The IBM Marketing Representative must assure that a firm installation date is established prior to order confirmation.

Publications

- GA21-9500 IBM 5294 Model K01 Ideographic Enhancements Guide
- GA21-9369 IBM 5294 Model K01 Remote Control Unit Setup Procedures (shipped with the product)

SPECIFY

- Default Order Entry: Specify Codes may not be required when ordering a 5294. If other codes are not specified, appropriate defaults will be assumed based on the 3-digit country code. Default parameters are shown below.

- Voltage Defaults (AC, 50/60 Hz): < (Japan only) > #0802 for 100-127V. <)

Note: (Except Canada) If the default voltage is not desired, or if a default voltage is not listed for your country, specify desired voltage from the following:

#0802 100-127V
 #0801 200-240V

- Power Cord Default: The most commonly used plug for each country will be shipped with the machine.

For Japan, standard nonlocking plugs will be supplied.

If a standard plug is not listed for your country or is not desired by your customer, specify #2710 for a 50 Hz power cord without a plug or #2746 for a 60 Hz power cord without a plug.

- Color Default: Pearl white only. No specify code required.
- Language Nomenclature Defaults: Japan - Japanese Katakana #2973.
- Communication Cable: The appropriate 6m (20 ft) communication cable is provided as standard for the communication feature ordered. No specify code required.

SPECIAL FEATURES
Non-Communications Features

Extended Cluster (#2550): Provides two additional cable connections. Allows attachment of up to eight workstations (3179 mdl 2, 3180-2, 3196 mdl A1X, B1X, 3197 mdl C1X, D1X, 5219 mdl D01 or D02, 5224, 5225, 5251 mdls 11 and 999, 5256, 5291, 5292, and 5555-B). The maximum allowable length of twinaxial cable on each port is 1,525m (5,000 ft). To attach multiple workstations to one twinaxial cable, see Cable-Thru (#2680) for the 5225, 5251 mdls 11 and 999, and 5256. Maximum: One. Field Installation: Yes.

Expanded Function (#3600): Provides the following functions:

- Copy provides for the direct transfer of screen character images from the 5251-11, 5291, 5292, 3180-2 or 3196 mdl A1X, B1X, 3197 mdl C1X, D1X, to a printer attached to the 5294. Selection and allocation of the printer is controlled by the host S/38. Copy from workstations in ideographic mode is not supported.
- Magnetic Stripe Reader control provides control for Magnetic Stripe Reader (#4910) on the attached 5251 mdl 11 (or magnetic slot reader control, RPQ 841500 - on the attached 5292).
- Self-Check Number provides modulo 10 and 11 checking to assure that all digits of a number have been correctly keyed from the attached 3180-2, 3196 mdl A1X, B1X, 3179 mdl C1X, D1X, 5251, 5291, or 5292 keyboards.
- Selector Light-Pen Control provides control for Selector Pen (#6300) features on attached 5251 mdl 11.

Field Installation: Yes. Prerequisites: #3610.

Feature Adapter Card (#3610): This adapter provides the necessary card space within the 5294 to install either Expanded Function (#3600) or X.21 Switched (#5656). Maximum: One. Field Installation: Yes.

Communications Features

CCITT Interface (#3701): Provides an interface for attachment of an IBM modem or PTT mandatory service or other non-IBM modems meeting CCITT V.24/V.28 characteristics. Non-IBM modems (other than PTT mandatory modems) may be attached subject to the Multiple Supplier Systems Policy. This feature can also be used for attachment to X.21 public data networks that use a DCE providing an X.21bis interface. CCITT Interface (#3701) is an integrated adapter for nonswitched point-to-point, multipoint, and switched point-to-point data transmission at speeds of 2400, 4800, 9600, 14,400, and 19,200 bps. A 6m (20-ft) EIA RS-232-C interface cable is provided with this feature. Limitations: Cannot be installed with X.21 Adapter (#5655). Field Installation: Yes.

EIA/CCITT Adapter Cable (#4700): An 18-inch adapter cable is available if a modem eliminator or a limited distance modem is to be used with interface #3701. Field Installation: Yes. (See "Accessories" for field installation.)

X.21 Adapter (#5655): This feature provides an interface for connecting to a DCE which has an interface that complies with CCITT recommendation X.21 and X.24/X.27 for electrical characteristics and interface pin assignments. This feature may be used with the 5294 for SDLC communication over nonswitched public data network facilities and may also be used with #5656 for attachment to X.21 switched public data network facilities. It provides point-to-point data transmission speeds of 2400, 4800, 9600 bps. Refer to Chart L (switched) or Chart N (nonswitched) in the M2700 pages for the networks and data circuit-terminating equipment (DCE) that are supported. The network establishes the data rate and supplies the clock. Usage of this feature on an X.21 network is dependent on the availability of an X.21 network that is compatible with IBM's implementation of X.21 as described in the "IBM Implementation of X.21 General Information Manual", GA27-3287. The 5294 can communicate via the X.21bis interface to a S/38. In this method of attachment, the 5294 uses the CCITT (V.24/V.28) interface. Also, the 5294 can communicate via the X.21 Adapter with a S/36 or S/38 that has an X.21bis interface. Refer to Chart M (X.21 non-switched) in the M2700 pages for information on the X.21 facilities. Limitations: Cannot be installed with #3701.

X.21 Switched Support (#5656): Provides support for attaching the 5294 to X.21 switched networks. #5656 supports SDLC communication over X.21 switched network facilities. It provides the protocol for X.21 switched communications. The usage of this feature is dependent on the availability of an X.21 network that is compatible with IBM's implementation of X.21 as described in the "IBM Implementation of X.21 General Information Manual", GA27-3287. Many X.21 switched network subscription options are supported. See the "5250 Information Display System Planning and Site Preparation Guide", GA21-9337, for details. Prerequisites: X.21 Adapter (#5655) and Feature Adapter Card (#3610). (#3610 is a prerequisite to #5656 or #3600 but should only be ordered once, even if more than one of these features are installed.) Limitation: Cannot be installed with X.25 Support (#5680). Maximum: One. Field Installation: Yes.

ACCESSORIES

Power Cable: A 1.8m (6 ft) power cable with a standard nonlocking plug is available. The power cable is pluggable at the machine. Order specifying P/N 6838234.

EIA/CCITT Adapter Cable: An 18-inch adapter cable is available in all countries if a modem eliminator is to be used with interface #3701. Order specifying P/N 2452096.

Cables: The twinaxial cables and/or associated parts to interconnect the 5294 and attached system may be purchased from IBM or from a customer-selected source. For the description of these cables and parts, see the "IBM 5250 Information Display System Planning and Site Preparation Guide", GA21-9337. The customer is

responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.

Twinaxial Cabling

Twinaxial Connector Kit: Includes two connectors. Twinaxial Wire and one Twinaxial Connector Kit are required for each attachment cable. Individual connectors are available for replacement. Order as follows:

P/N 7362268 Connector kit for vinyl-covered cables.

P/N 7362229 Individual connector (replacement) for vinyl-covered cables.

Twinaxial Wire: Order must specify the desired length. Twinaxial Wire and one Twinaxial Connector Kit are required for each attach-

ment cable. (Vinyl-covered cable is an indoor/outdoor cable.) Order as follows:

P/N 7362211 For vinyl-covered cable.

Twinaxial Cable Assembly: Includes two connectors attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly. Order as follows:

P/N 7362267 Cable assembly with vinyl-coated wire.

Twinaxial Adapter: Permits two Twinaxial Cable Assemblies to be joined together.

P/N 7362230 Twinaxial Adapter

SUPPLIES (NONE) <

MACHINES

5320 SYSTEM UNIT

[NO LONGER AVAILABLE]

Special features, accessories, RPQs, and MESs may be obtained on an "as available" basis only.

PURPOSE

The System/32 is a compact commercial data processing system designed primarily for small businesses.

MODELS

Model	Printing Speed	Disk Storage Capacity (Bytes)
A01	40 cps unidirectional	3,210,240
A02	40 cps unidirectional	5,053,440
A03	40 cps unidirectional	9,169,920
A04	40 cps unidirectional	13,777,920
A11	40 cps bidirectional	3,210,240
A12	40 cps bidirectional	5,053,440
A13	40 cps bidirectional	9,169,920
A14	40 cps bidirectional	13,777,920
A21	80 cps bidirectional	3,210,240
A22	80 cps bidirectional	5,053,440
A23	80 cps bidirectional	9,169,920
A24	80 cps bidirectional	13,777,920
A31	120 cps bidirectional	3,210,240
A32	120 cps bidirectional	5,053,440
A33	120 cps bidirectional	9,169,920
A34	120 cps bidirectional	13,777,920
B11	50 lpm	3,210,240
B12	50 lpm	5,053,440
B13	50 lpm	9,169,920
B14	50 lpm	13,777,920
B21	100 lpm	3,210,240
B22	100 lpm	5,053,440
B23	100 lpm	9,169,920
B24	100 lpm	13,777,920
B31	155 lpm	3,210,240
B32	155 lpm	5,053,440
B33	155 lpm	9,169,920
B34	155 lpm	13,777,920
C41	285 lpm	3,210,240
C42	285 lpm	5,053,440
C43	285 lpm	9,169,920
C44	285 lpm	13,777,920

Note: All models have 16,384 bytes of main storage standard.

Limitations: See the appropriate host system programming pages for possible restrictions.

HIGHLIGHTS

- Operator-oriented data processing.
- Direct keyboard data entry.
- Display screen.
- Batch processing with stored job stream procedures.
- RPG II programming support.
- Communications capability via SDLC or BSC.
- Word processing functions.
- Metal Oxide Semiconductor Field Effect Transistor (MOSFET) main storage.
- 600-nanosecond main storage cycle time.
- Main storage available in 16K, 24K, or 32K bytes with 2K bytes reserved for SCP functions.
- Internal structure is EBCDIC 8-bit byte.

Keyboard: Used for data entry and operator/system communication. It features a familiar typewriter layout plus a 10-key proof keyboard and function keys. The top row of typewriter keys are dual-defined, providing 24 command keys. In addition to the standard alphanumeric keys, the keyboard has record, field, character advance, backspace, repeat, and printer control keys. A Dual Case Keyboard and Display feature provides upper/lower case and special character/graphic support and a code key used by application programs to simulate the Mag Card (72, 80, 82, and Executive) Typewriter code key.

Display Screen: Provides operator guidance and prompting and auxiliary output under program control. Up to 240 characters can be

displayed, six rows of 40 characters each. All data entered through the keyboard is displayed on the screen by the programming system.

Disk Storage: Capacity of 3.2, 5.0, 9.1, or 13.7 million bytes of nonremovable high-speed direct access storage. The disk rotates at 2,964 rpm, yielding a data rate of up to 889,000 bytes per second, and so permitting efficient sequential and random access processing. The following table provides corresponding capacity data and access times. For more specific access times, refer to timing charts. Average latency is 10.1 milliseconds.

	3.2MB	5.0MB	9.1MB	13.7MB
Bytes/Sector	256	256	256	256
Sectors/Track	60	60	60	60
Tracks/Cylinder	2	2	2	3
Bytes/Cylinder	30,720	30,720	30,720	46,080
Cylinders	104.5	164.5	298.5	299.0
Access Time (ms)				
Minimum	13.0	13.0	14.2	14.2
Average	50.4	70.0	72.5	72.5
Maximum	121.0	180.0	166.9	166.9

Line Printing: B and C mdls with a 48-character print belt provide printed output at nominal rated speeds of 50, 100, 155, or 285 lpm depending upon mdl. Included as standard is one engraved font print belt. See "Specify" for proper ordering. Nominal printing speeds are as follows:

Character Set Size				
MDL	48	64	96	128
B1X	50 lpm	50 lpm	50 lpm	40 lpm
B2X	100 lpm	100 lpm	80 lpm	40 lpm
B3X	155 lpm	120 lpm	80 lpm	40 lpm
C4X	285 lpm	225 lpm	160 lpm	85 lpm

Horizontal spacing is 10 characters to the inch with a 132-position print line. Vertical spacing is six lines to the inch. For eight lines to the inch vertical spacing and programming support, see RPQ S40127. A variable width forms tractor provides for feeding continuous forms. Refer to *Forms Design Printers Reference Guide* (GA24-3488) for forms design considerations and limitations. Forms jam detection is standard. See "Type Catalog" for character set arrays and styles.

Serial Printing: The A mdls print at a maximum rate of 40 cps in a unidirectional mode or 40, 80, or 120 cps in a bidirectional mode depending on mdl. Matrix characters are formed by eight vertical wires. Horizontal spacing is 10 characters to the inch with a 132-position print line. Vertical spacing is six lines to the inch. A variable width forms tractor provides for feeding continuous forms. Refer to *Forms Design Printers Reference Guide* (GA24-3488) for forms design considerations and limitations. Single form/ledger cards may be processed typewriter-fashion. See "Type Catalog" for character set arrays.

Notes:

- Differences between line and serial printing are transparent to RPG II object code for continuous forms and recompilation is not required when changing printer mdls.
- System/32 printed output is not recommended for optical character reading.
- A forms stand, providing for the feeding and stacking of continuous forms, is provided with the system.
- Printed output utilizing Artisan or Modified Courier print belts should not be expected to compare in quality to the Selectric typewriter.

Diskette Drive: Provides the capability of entering data recorded offline and also is a load/dump backup facility via the Diskette 1. The diskette also provides compatible media for interchange with other systems utilizing Diskette 1 (up to 242,944 byte capacity). For System/32 use, Diskette 1 capacity is 246,272 bytes in standard interchange format and 303,104 bytes in 512-byte extended format. 128-byte records are processed at rates of up to 3,400 per minute reading and up to 1,800 per minute writing. "Read" and "Write" are not overlapped with processing or other devices. However, "one track forward seek" is overlapped.

Card I/O: Utilizing the 129 Card Data Recorder (80-column) provides reading up to 50 cards per minute and punching or punching and printing from 12 to 50 cards per minute. In punch mode, throughput may vary. When two or more adjacent columns are blank, the equivalent of read speed is achieved until a non-blank column is

5320 System Unit (cont'd)

encountered. Utilizing the 5496 Data Recorder (96-column) provides reading, punching, and printing speeds of up to 21 cards per minute. Cannot be installed with 5321 Mag Card Unit Attachment (#4900) and Half-Line Space Printing (#4530). Card I/O operation within the same program as the diskette drive, BSCA, or SDLC is not supported.

The Data Recorder Attachment (#3200) on the 5320 functions as follows when attached to:

- 129 mdl 2 with a 3741/5320 Attachment (#8201): The full 256-character EBCDIC set is supported (Japan only+), including the 128-character Katakana set +). On/off line control is provided by a manual switch on the 129.
- 5496 mdl 1 with a 3741/5320 Attachment (#7850): The 6-bit 64-character set is supported (Japan only+), which does not include Katakana characters +). On/off line control is provided by a manual switch on the 5496.

(Japan only+)

The Data Recorder Katakana Attachment (#2800) on the 5320 functions as follows when attached to the 5496 mdl 1 with a 5320/5406 Katakana Attachment (#2893): The full 256-character EBCDIC set is supported. Code conversion from card code to EBCDIC (and vice versa) will be effected as defined in the *System/32 Models 8, 10, 12, and 15 Components Reference Manual* (GA21-9236). On/off line control is provided by a manual switch located on the 5320 CE control panel. -)

Mag Card I/O: Utilizing the 5321 Mag Card Unit provides reading and recording of information up to 102 characters per track and 50 tracks per card. Reading is at the rate of 230 milliseconds per track; recording is at the rate of 450 milliseconds per track. The 5321 Mag Card Unit uses the same card and recording discipline as the Mag Card products. Operation of the Mag Card Unit within the same program as the diskette drive, BSCA, or SDLC is not supported.

Customer Responsibilities: The customer must be advised, in writing, of certain responsibilities related to the installation and maintenance of PTT facilities/services as well as the IBM equipment. For further information, see M2700 pages and "Teleprocessing Systems" in the GI section.

The marketing representative must have the customer obtain a firm installation date for the start of transmission services (including any required modems) prior to processing the Order Confirmation card.

Publications: *System/32 Bibliography* (GC20-0032). Refer to *IBM System/32 Installation Manual - Physical Planning* (GA21-9177) for physical installation requirements.

SPECIFY

- Voltage (AC, 1-phase): One must be specified.

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	115V #9901
123.5V #2811	200V #2732
200V #2806	208V #9902
220V #2813	230V #9904
235V #2814	

- Color: Specify #9041 for red, #9042 for yellow, #9043 for blue, or #9045 for light gray.
- Language Group: Includes nomenclature, keyboard, display screen graphics, and printer graphics (A mdls) or print belt (B and C mdls). See "Type Catalog" for keyboard nomenclature and print arrays. Select one of the following:

Brazilian	#2975
EBCDIC	#2966
French AZERTY	#2964
French QWERTY	#2970
German QWERTY	#2972
German QWERTZ	#2957
Italian	#2968
Japanese	#2955
Japanese Katakana *	#2973
Portuguese	#2959
Spanish	#2960
Spanish Speaking	#2961

* #2768, #2770, or #2873 is a prerequisite (B and C mdls).

- Character Set/Type Style (B and C mdls): Available at time of manufacture only, except when upgrading an installed mdl A.

Select one of the following to specify the print belt supplied with the system. For additional print belts, see "Accessories".

48-character FORTRAN	#9492
48-character set	#2767
64-character set *	#2768
96-character Katakana	#2770
96-character Word Processing Artisan	#2790
96-character Word Processing Modified Courier	#2791
128-character Katakana	#2873

* A 64-character Katakana print belt (#2968 and #2973) is not satisfactory as the only print belt for the system since this belt does not contain the standard System/32 character set required for program compilation and system maintenance.

- Word Processing (B and C mdls): For systems utilizing word processing features, the keyboard supported must be specified. Select the proper specify code from the following chart. Only the combinations shown are valid.

Language Group	Keyboard ID and Country	Keyboard Specify Code
French AZERTY	31 - France AZERTY	#5156
French AZERTY	32 - France	#5157
German QWERTZ	26, 27 - Germany	#5152
German QWERTZ	28 - Germany	#5154
German QWERTZ	29 - Germany	#5155
Italian	41, 46 - Italy	#5163

- Modem Cable (SDLC or BSCA only): Required for attaching System/32 to the communications facility regardless of whether an IBM integrated modem or an external modem is used. Specify #9460 for a 6 meter (20 foot) cable or #9461 for a 12 meter (40 foot) cable.
- Upending: If required, upending may be accomplished by following the instructions shipped with the system.

SPECIAL FEATURES
Non-Communications Features

Additional Storage (#1005): Provides an additional 8,192 bytes of main storage. **Maximum:** Two. **Field Installation:** Yes.

Control Storage Increment (#1500): Provides additional control storage and access to a Scientific Instruction Set, a group of additional instructions which perform functions commonly required in scientific programs. Required for execution of FORTRAN IV (5725-FO1) generated object programs. #1500 is not required for compiling programs. **Maximum:** One. **Field Installation:** Yes.

(Japan only+ **Data Recorder Katakana Attachment (#2800):** To attach a 5496 Data Recorder mdl 1 equipped with 5320/5406 Katakana Attachment (#2893). A 3 meter (10 foot) cable and connector required to attach the 5496 to the 5320 is included. Card I/O operation within the same program as the diskette drive, BSCA, or SDLC is not supported. **Limitations:** Cannot be installed with 5321 Mag Card Unit Attachment (#4900) or Half-Line Space Printing (#4530). **Maximum:** One. **Field Installation:** Yes. -)

Data Recorder Attachment (#3200): To attach either a 129 Card Data Recorder mdl 2 equipped with a 3741/5320 Attachment (#8201) or a 5496 Data Recorder mdl 1 equipped with a 2772/3741/5320 Attachment (#7850). A 3 meter (10 foot) cable and connector required to attach a 129 or 5496 to the 5320 is included. Card I/O operation within the same program as the diskette drive, BSCA, or SDLC is not supported. **Limitations:** Cannot be installed with Half-Line Space Printing (#4530) or 5321 Mag Card Unit Attachment (#4900). **Maximum:** One. **Field Installation:** Yes.

Dual Case Keyboard and Display (#3400): [B, C mdls] Provides upper and lower case characters and new graphics and redefines the character/graphic arrangement of the System/32 keyboard and display. See "Type Catalog" for character/graphic arrangements supported. One set of prompt templates (ten keyboard arrangements) is supplied with #3400. See "Accessories" for additional sets. **Limitations:** Not compatible with RPO GG0339 (additional print belt -- 96-character) or RPO S40127 (six or eight lines per inch spacing). **Field Installation:** Yes. **Specify:** The proper keyboard specify codes must be indicated. See "Specify".

Half-Line Space Printing (#4530): [B, C mdls] Provides half-line vertical spacing for printing. This feature supports superscript and

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subscript requirements normally associated with the character sets provided by Artisan and Modified Courier print belts. **Limitations:** Application programs using half-line spacing must include repositioning to the next full vertical space where full space alignment is required. Cannot be installed with RPQ S40127 (eight lines per inch spacing) or Data Recorder Attachment (#3200). **Field Installation:** Yes.

Keylock (#4655): Replaces on/off power switch to protect against unauthorized use. See "Accessories" for additional information. **Field Installation:** Yes.

5321 Mag Card Unit Attachment (#4900): [B, C mdl] To attach a 5321 Mag Card Unit Mdl 1 to a System/32. A 4.5 meter (15 foot) cable and connector required to attach the 5321 is included. **Limitations:** Cannot be installed with Data Recorder Attachment (#3200). **Maximum:** One. **Field Installation:** Yes.

Communications Features

Binary Synchronous Communications Adapter (BSCA) (#2074): In conjunction with stored program control, this feature permits System/32 to function on a switched, nonswitched, or private communications line as a processor/terminal communicating in binary synchronous mode with:

- Another System/32 equipped with #2074.
- A System/34 equipped with a communication adapter.
- A System/38 with appropriately configured BSC adapter and sub-features (point-to-point only).
- A 6640 Document Printer equipped with BSC/EBCDIC feature. Requires communicating features #3700 and #3701. System/32 requires SCP (#6002) with WPCU.
- Office System 6/430, 6/440, and 6/450 equipped with BSC/EBCDIC feature. Requires communicating features #3700 and #3701. System/32 requires SCP (#6002) with WPCU.
- A Mag Card 82 Typewriter - Communicating (requires communicating features #3700 and #3701) and 6240 Mag Card Typewriter - Communicating. System/32 requires SCP (#6002).
- A System/3 equipped with #2074 or #2084.
- A System/360 mdl 20 equipped with #2074 or #2720.
- A System/360 or System/370 (which is supported by OS or DOS BTAM, OS TCAM, OS/VS1 or OS/VS2 BTAM, TCAM or VTAM, DOS/VS BTAM, or VTAM) via an Integrated Communications Adapter, a 2701 Data Adapter Unit, or a 3704/3705 Communications Controller with the Network Control Program (NCP) or the Partitioned Emulation Program (PEP), any of which are equipped with a binary synchronous adapter and appropriate sub-features.
- A 3741 Data Station mdl 2 or 3741 Programmable Workstation mdl 4.
- A 3747 Data Converter equipped with Communications Adapter (#1660).
- A 3750 System equipped with BSCA (#1450) on the 3751 (nonswitched point-to-point only). See the S3750 pages for restrictions.
- A 5110 Computer equipped with BSCA #2074 (as a 3741 mdl 2 or 4).
- A 5265 Communicating Mdl (point-to-point, batch transmission only).
- A 5280 Distributed Data System equipped with Communications Adapter (#2500).
- A System/7 equipped with BSCA (#2074).

See the System/32 programming pages for a description of the program support provided on System/32 for this feature.

The BSCA feature is designed to operate at speeds between 600 and 7200 bps over PTT switched or nonswitched facilities or equivalent privately-owned communication facilities.

The BSCA feature (#2074) will allow System/32 to communicate on a nonswitched point-to-point or multipoint line at speeds of up to 7200 bps and on a switched point-to-point line at speeds of up to 4800 bps. See M2700 pages for information on communication facilities.

On a multipoint line System/32 operates as a tributary station. No support is provided for System/32 to operate as a control station on a

multipoint line. Therefore, communication with other devices which do not provide control station capability must be done on a point-to-point line only.

This feature, Binary Synchronous Communications Adapter, will operate in half-duplex mode over dial (switched network) facilities, and in half-duplex mode over nonswitched (or equivalent private) communication lines which may be duplex or half-duplex facilities. Operation of this feature on System/32 will be overlapped at all transmission rates with processing and/or I/O device operations including disk. BSC units at each termination or drop point of a data link to which the System/32 is attached must use the same clocking source (modem or business machine) and must be set to operate at the same transmission rate and to use the same transmission code.

Switched network versions include as a basic capability support of manual dial and manual or auto-answer operations (where the attached modem supports this capability).

EBCDIC or EBCDIC Text Transparency are standard. One of the above transmission codes is selected at program compilation time.

Limitations: Cannot be installed with SDLC (#6301). Card I/O, the 5321 Mag Card Unit, and the diskette drive cannot be operated within the same program as the BSCA. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3701, #5500, #5501, #5600, #5602, (Canada only+ or #5610. +) **Specify:** Modem cable (see "Specify").

CCITT Interface (#3701): Provides a cable and interface for the attachment of an IBM modem or PTT mandatory modem complying with CCITT Recommendations V.24/V.28. For ISO standard 2110 and other relevant CCITT Recommendations, refer to M2700 pages. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Note:** This feature may also require Internal Clock (#4703) if the external modem does not provide its own clocking. **Limitations:** Cannot be installed with 1200 bps Integrated Modem (#5500, #5501) or 2400 bps Integrated Modem (#5600, #5602 (Canada only+ , #5610 +)). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301. (Japan only+ **Specify:** #2946 when attaching a non-IBM modem. This is to satisfy the NTT'S DTE self-test requirements. +)

Internal Clock (#4703): Generates synchronizing and timing signals for SDLC or BSC operation when they are not provided by the modem. Clocking speeds available with this feature are 600 bps and 1200 bps. Selection of speed is indicated via a system utility program (SCP). When this feature is installed on System/32, all other SDLC or BSC stations attached to the same data link must also be equipped with a similar Internal Clock feature. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #3701, #5500, or #5501.

(Except Canada+ **1200 bps Integrated Modem (#5500, #5501):** A modem for SDLC or BSC data transmission at 1200 bps over non-switched facilities or switched network. Half-speed operation at 600 bps is indicated via a system utility program (SCP). Available in two different versions: #5500 - nonswitched and #5501 - switched with auto-answer. Attachment to the nonswitched (2- or 4-wire) facilities is via an IBM-provided cable directly to the line, Facility DA3. Attachment to the switched network is via an IBM-provided cable directly to the line, Facility CA2. The device communicating with System/32 must also be equipped with 1200 bps integrated modem/line adapter. **Limitations:** Cannot be installed with CCITT Interface (#3701) or 2400 bps Integrated Modem (+)(Except Canada+ #5600, #5602). #5500 and #5501 cannot be installed together. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #4703. +) (Japan only+ **Specify:** #2943 for attachment of #5500 to NTT D-1 Service. +)

(Canada only+ **1200 bps Integrated Modem (#5501):** A modem for SDLC or BSC data transmission at 1200 bps over the switched network. Auto-answer capability is included. Half-speed operation at 600 bps is indicated via a system utility program (SCP). Attachment to the switched network is via an IBM-provided cable to a PTT arrangement Type CBS. The device communicating with System/32 must be equipped with a 1200 bps integrated modem/line adapter. **Limitations:** Cannot be installed with CCITT Interface (#3701) or another integrated modem (#5500, #5600, #5602, #5610). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #4703. +)

2400 bps Integrated Modem (#5600, #5602): A modem for SDLC or BSC data transmission at 2400 bps over nonswitched facilities, equivalent to and compatible with similarly featured 3872 modems. Half-speed operations at 1200 bps is indicated via a system utility program (SCP). Available in two different versions: #5600 - non-

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switched point-to-point and #5602 - nonswitched multipoint tributary. Attachment to nonswitched (2- or 4-wire) facilities is via an IBM-provided cable directly to the line, Facility DA5. Operator controls provide for adjusting "transmit" and "receive" equalization. The device communicating with System/32 must also be equipped with 2400 bps integrated modem/line adapter or 3872 modem. **Limitations:** Cannot be installed with CCITT Interface (#3701) or 1200 bps Integrated Modem (#5500, #5501). 2400 bps Integrated Modems (#5600, #5602 (Canada only+ , #5610 +)) cannot be installed together. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #5733. (Japan only+ **Specify:** #2943 for attachment of #5600 or #5602 to NTT D-1 Service. +)

(Canada only+ **2400 bps Integrated Modem (#5610):** A modem for SDLC or BSC data transmission at 2400 bps over the switched network with automatic answer capability. This modem is equivalent to and compatible with similarly featured 3872 modems. Half-speed operation at 1200 bps is indicated via a system utility program (SCP). Attachment to the switched network is via an IBM-provided cable to +) (Canada only+ a PTT arrangement Type CBS. +)(Canada only+ The device communicating with System/32 must also be equipped with a 2400 bps integrated modem/line adapter or 3872 modem. **Limitations:** Cannot be installed with EIA Interface (#3701) or 1200 bps Integrated Modem (#5500, #5501). #5600, #5602, and #5610 cannot be installed together. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #5733. +)

Processing Unit Expansion (#5733): Provides for mounting of one 2400 bps Integrated Modem (#5600, #5602(Canada only+ , #5610 +)). **Limitations:** Cannot be installed with CCITT Interface (#3701) or 1200 bps Integrated Modem (#5500, #5501). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #5600, #5602, or (Canada only+ #5610. +)

Synchronous Data Link Control Communications (SDLC) (#6301): In conjunction with stored program control, this feature provides communications capability with S/370 mdls 115, 125, 135, 145, 155II, 158, 158MP, 165II, 168, and 168MP via a 3704 or 3705 Communications Controller equipped with appropriate features. See M3704 and 3705 pages. The S/370 must be operating under control of DOS/VS, OS/VS1, or OS/VS2 VTAM and the 3704/3705 under control of the Network Control Program/VS (NCP/VS). See the System/32 programming pages for a description of the program support provided on System/32 for this feature.

The SDLC feature is designed to operate at speeds between 600 and 7200 bps over PTT switched or nonswitched facilities or equivalent privately-owned communication facilities.

SDLC (#6301) will allow System/32 to communicate on a nonswitched point-to-point or multipoint line at speeds of up to 7200 bps and on a switched point-to-point line at speeds of up to 4800 bps. See M2700 pages for information on communication facilities.

This SDLC feature will operate in half-duplex mode over dial (switched network) facilities, and in half-duplex mode over nonswitched (or equivalent private) communication lines which may be duplex or half-duplex facilities. Operation of this feature on System/32 will be overlapped at all transmission rates with processing and/or I/O device operations including fixed disk. SDLC units at each termination or drop point of a data line to which the System/32 is attached must use the same clocking source (modem or business machine), the same transmission encoding option (NRZ or NRZI), and must be operating at the same transmission rate.

Switched network versions include as a basic capability support of manual dial and manual or auto-answer operations (where the attached modem supports this capability).

The System/32 operates as an SDLC secondary station and can operate on a communication line with other IBM SDLC terminals.

Limitations: Cannot be installed with BSCA (#2074). Card I/O or the diskette drive cannot be operated within the same program as SDLC. SDLC supported by SCP (5723-SC1) requires 24K bytes of main storage. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3701, #5500, #5501, #5600, #5602, or (Canada only+ #5610. +) **Specify:** Modem cable (see "Specify").

(Canada only+ **Switched Network Backup (SNBU) (#7951):** Provides for backup attachment of System/32 to the public switched network when the 2400 bps Integrated Modem (#5600, #5602, #5610) is used on a nonswitched line as the primary facility. It can communicate with another 2400 bps Integrated Modem or a 3872 modem when either is equipped with switched network capability. Selection of the primary or backup facility is via an operator-invoked system utility program (SCP).

Attachment to the switched network is made via +) (Canada only+ a PTT arrangement Type CDT or equivalent. +) (Canada only+ Calls must be established and answered manually. Operator intervention, program modification, or both may be required on the using system/terminal. This feature can be used with BTAM programs for DOS, DOS/VS, OS, OS/VS1, and OS/VS2 in certain configurations or with TCAM/VTAM under OS/VS1 or OS/VS2. Additional customer program routines will be required, in existing BTAM programming, to fully utilize the capabilities of Switched Network Backup. For additional information, see the *3872 Modem User's Guide* (GA27-3058). **Limitations:** Cannot be installed with SDLC (#6301) or Switched Network Backup with Auto-Answer (#7952). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074, #5600 or #5602, and #5733. +)

(Canada only+ **Switched Network Backup with Auto-Answer (SNBU/AA) (#7952):** Same as Switched Network Backup (#7951) plus the added capability of automatically answering incoming calls when attached to +) (Canada only+ a PTT arrangement Type CBS or equivalent. +) (Canada only+ Selection of the primary or backup facility is via an operator-invoked system utility program (SCP). Operator intervention, program modification, or both may be required on the using system/terminal. This feature can be used with BTAM programs for DOS, DOS/VS, OS, OS/VS1 or OS/VS2 in certain configurations or with TCAM/VTAM under OS/VS1 or OS/VS2. Additional customer program routines will be required, in existing BTAM programming, to fully utilize the capabilities of the Switched Network Backup feature. For additional information, see the *3872 Modem User's Guide* (GA27-3058). **Limitations:** Cannot be installed with SDLC (#6301) or Switched Network Backup (#7951). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2074, #5600 or #5602, and #5733. +)

IBM Modems:

Modem	Speed (bps)	Facility
3863	2400	C3, D5
3864	4800	D6
3872 mdl 1	2400/1200	C3, D5
3976 mdl 3	1200/600	C2, D3

Note: For communications capabilities, product utilization, and special features, see M2700, 3863, 3864, and 3872 pages.

A system utility program (SCP) is provided for the selection of certain data communications characteristics such as full-speed or half-speed, internal or external modem clocking, answer tone control, line type, station address, etc. See the *System Control Programming Reference Manual* (GC21-7593) for a complete description of \$SETC utility.

The CCITT Interface (#3701) permits operation with one of the IBM modems listed above and following. Consult your Teleprocessing Coordinator for further details.

(Canada only+ Modem	Speed (bps)
The TCTS Dataroute Network via the QSA2A DCE CN/CPT Infodat Network	4800/2400 -)

To verify the proper integrated modem or external modem interface configuration, refer to the following chart. Select one of the categories numbered from 1 to 3 and follow across for the required and optional special features.

MACHINES

5320 System Unit (cont'd)
Modem/Interface Feature Configurator

(Canada only+)

Modem/Interface	Internal Clock (#4703)	Processing Unit Expansion (#5733)	SNBU (#7951) or SNBU/AA (#7952) +)
(Canada only+) CCITT Interface (#3701)	Optional	-	- +)
(Canada only+) 1200 bps Integrated Modem:			

Nonswitched (#5500)	Required	-	-
Switched with Auto-Answer (#5501)	Required	-	-

2400 bps Integrated Modem:

Nonswitched Point-to-Point (#5600)	-	Required	Optional
Nonswitched Multipoint Tributary (#5602)	-	Required	Optional
Switched Network Auto-Answer (#5610)	-	Required	- +)

(Except Canada+)

Modem/Interface	Internal Clock (#4703)	Processing Unit Expansion (#5733)
CCITT Interface (#3701)	Optional	-

1200 bps Integrated Modem:

Nonswitched (#5500)	Required	-
Switched with Auto-Answer (#5501)	Required	-

2400 bps Integrated Modem: +)

(Except Canada+) Nonswitched Point-to-Point (#5600)	-	Required
Nonswitched Multipoint Tributary (#5602)	-	Required +)

Maximum: One IBM modem can be attached to a System/32. **Field Installation:** Yes. **Prerequisites:** #2074 or #6301 and #3701.

References:

Contact IBM for information concerning external modems attachable to the System/32 SDLC or BSCA features.

See M2700 pages for additional information concerning modems, communications facilities, machine attachment requirements, terminal intermix, and operating capabilities.

Refer to SCP (#6002) for Word Processing Communications Utility support of 6640 Document Printer, Office Systems 6/430, 6/440, 6/450, a second Word Processing System/32, and a Mag Card 82 Typewriter - Communicating.

TERMS and CONDITIONS

Plan Offering: Plan B
Purchase Option: 45 %
Machine Group: D

Warranty: B
Per Call: 2
Educational Allowance: Yes

MODEL CONVERSIONS

Model conversions are field installable.

Any model conversion that involves a disk storage capacity requires replacement of the disk storage mechanism. Adequate provision must be made for retaining the data contained on the replaced disk mechanism and elimination of user proprietary information.

Model conversions between A, B, and C models require replacement of the print mechanism and may require replacement of the power supply. A0X, A1X, or A2X models, when converted to A31, A32, A33, or A34 models, must be at EC level 828749 or the print mechanism must be replaced. On systems installed prior to 1977, field upgrades from A or B models to C models cannot be made on systems with less than 200V power (#2730, #2804, #2805, #2811, #9901). To accomplish such an

upgrade, 200V or more power (#2732, #2806, #2813, #2814, #9902, #9904) must be provided at the wall receptacle or via auto-transformer. If this is not possible, an RPQ must be submitted.

When upgrading from model A, a print belt must be specified. See "Specify".

The upgrade purchase prices for model conversions may be greater than the purchase price differentials. Customers should carefully evaluate their future requirements when purchasing a system.

Replaced parts from any model conversion become the property of IBM.

ACCESSORIES

Locks and Keys: The 5320 with Keylock (#4655) is shipped with two keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys to original purchaser.) Key identification number and P/N **2546418** must accompany each order. Allow six to eight weeks for delivery.

Additional Print Belts: [B, C mdl] Purchase-only metal belts with engraved font. Available in a variety of character arrangements and type styles as indicated below. DPMO order must contain two feature codes for each additional print belt.

For data processing (monocase), select one code from each of the following two tables:

Character Set Size:	
48	#2867
64	#2868
96 Katakana	#2870
128 Katakana	#2869

Country Arrangement:

Brazil	#2775
EBCDIC	#2756
FORTAN *	#5552
France	#2771
Germany QWERTY	#2772
Germany QWERTZ	#2757
Italy	#2771
Japan	#2755
Japan Katakana **	#2773
Portugal	#2749
Spain	#2760
Spanish Speaking	#2761

* #2867 is a prerequisite.

** #2868, #2869, or #2870 is a prerequisite.

For word processing (dual case), select one code from each of the following two tables:

Type Style:

96-character Artisan	#2780
96-character Modified Courier	#2781

Country	Keyboard ID	Specify Code
France	32	#5157
France AZERTY	31	#5156
Germany	26, 27	#5152
Germany	28	#5154
Germany	29	#5155
Italy	41, 46	#5163

Dual Case Keyboard Prompt Templates: When Dual Case Keyboard and Display (#3400) is ordered, prompt templates for keyboard redefinition are supplied. Additional templates may be ordered by DPMO (purchase-only). Order by part number as determined by the typewriter keyboard to be supported.

Keyboard ID	Prompt Template
26, 27, 28, 29	P/N 2594687
31, 32	P/N 2594676
41, 46	P/N 2594677
56, 57	P/N 2594684
66, 67	P/N 2594674

Cables: A modem cable is required. See "Specify". No other cable order is required for the System/32.

5320 System Unit (cont'd)

SUPPLIES

Ribbons: A black ribbon is required: P/N **1136653** or equivalent for A mdls, P/N **1136634** or equivalent for B mdls, and P/N **1136670** or equivalent for C mdls.

Diskettes: For Diskette 1, contact IBM.

Mag Cards: For Mag Cards and related supply items, contact IBM.

5321 MAG CARD UNIT**PURPOSE**

The 5321 provides magnetic card input and output for System/32 and allows reading and recording to magnetic cards for the 5520 Administrative System.

MODELS**Model 1 001**

Limitations: Cannot be installed on 5320 A models. Cannot be installed on 5320 B or C models with 1255 Attachment (#1100) or Data Recorder Attachment (#3200) installed.

Maximum: Only one 5321 may be attached to a system.

Prerequisites: For System/32, the 5321 Mag Card Unit Attachment (#4900) and System Control Program (SCP) (5725-SC1) with #6002. For attachment to the 5525, the 5321 Mag Card Unit Attachment (#1100) and the 5520 Administrative Processing Program (5611-SS1) Release 2.

HIGHLIGHTS

The 5321 reads and records information using 50 track magnetic cards. Reading is at the maximum rate of 20 seconds per card (102 characters per track). Recording is at the maximum rate of 30 seconds per card (102 characters per track). Mag Card products may be used to prepare the cards to be read by the 5321. Playback of the cards recorded by the 5321 can be on Mag Card Selectric Typewriters, Mag Card II, 6640 Document Printer, Mag Card/A, 6240 Communicating Mag Card Typewriter, and the 6670 Information Distributor. Character sets and command codes are supported by application programming under licensed programs such as Word Processor/32 (5725-XX1) on System/32. For the 5520 Administrative System, however, see 5520 Programming pages for operating characteristics and restrictions in this area. The input hopper holds a maximum of 50 cards and the output stacker a maximum of 60 cards.

Publications: *System/32 Bibliography* (GC20-0032).

SPECIFY

- Voltage: One must be specified.

50 Hz	60 Hz
100V #2804	115V #9901
110V #2805	
123.5V #2811	
200V #2806	
220V #2813	
240V #2801	
- Operator Console: Language code for the console panel (nomenclature). One must be selected.

Canadian French	#2934
English US	#2924
French	#2928
German	#2929
Italian	#2932
- Cover: No specify required.
- Attachment: Specify #9457 for attachment to the 5320 or #9458 for attachment to the 5525. Note that #9458 must also be specified when changing attachment of an existing Mag Card Unit from the 5320 to the 5525.

SPECIAL FEATURES (None)**TERMS and CONDITIONS**

Plan Offering: Plan B	Warranty: B
Purchase Option: 45%	Per Call: 2
Machine Group: D	Educational Allowance: Yes

MODEL CONVERSIONS (None)**ACCESSORIES**

Cables: The 5321 is shipped with a 4.6 meter (15 foot) cable.

SUPPLIES

Magnetic Cards: Only diagnostic magnetic cards are shipped with the 5321. Magnetic cards for customer applications must be ordered separately. For magnetic cards and erase magnets, contact IBM.

MACHINES

5322 COMPUTER

[NO LONGER AVAILABLE]

PURPOSE

The System/23 Datamaster is a compact, desk-top, data processing system designed with many functions intended to simplify use by first time computer users. It is a distributed logic system architecturally structured to support file sharing by multiple workstations. Function-oriented hardware combined with licensed programs provide the additional capabilities of word processing and a flexible communications facility.

The 5322 Computer is a processor unit for the System/23. It contains main storage, arithmetic and logical processing circuits, control functions for I/O units on System/23 and also the keyboard/CRT. Most models have integrated diskette drive(s). A significant standard function of System/23 processors is an interpretive BASIC language processor which provides an integrated, high level, interactive language designed for commercial data processing applications.

MODELS

The model number of the 5322 is determined by the function, memory size, and integrated diskette capability as follows:

Model	Main Storage	Diskette Capacity	Number of Drives
<i>Data Processing Models</i>			
110	32KB	0MB	0
111	32KB	.3MB	1
112	32KB	.6MB	2
113	32KB	1.1MB	1
114	32KB	2.2MB	2
120	64KB	0MB	0
121	64KB	.3MB	1
122	64KB	.6MB	2
123	64KB	1.1MB	1
124	64KB	2.2MB	2
130	96KB	0MB	0
131	96KB	.3MB	1
132	96KB	.6MB	2
133	96KB	1.1MB	1
134	96KB	2.2MB	2
140	128KB	0MB	0
141	128KB	.3MB	1
142	128KB	.6MB	2
143	128KB	1.1MB	1
144	128KB	2.2MB	2
<i>Data Processing and Word Processing* Models</i>			
420	64KB	0MB	0
421	64KB	.3MB	1
422	64KB	.6MB	2
423	64KB	1.1MB	1
424	64KB	2.2MB	2
430	96KB	0MB	0
431	96KB	.3MB	1
432	96KB	.6MB	2
433	96KB	1.1MB	1
434	96KB	2.2MB	2
440	128KB	0MB	0
441	128KB	.3MB	1
442	128KB	.6MB	2
443	128KB	1.1MB	1
444	128KB	2.2MB	2

* See System/23 Word Processing requirements under "Standard Features".

The first digit of the mdl number indicates Data Processing function only (1XX) or Data Processing and Word Processing (4XX). The second digit of the mdl number indicates main storage size, and the third digit indicates the number of diskette drives and their capacity.

Maximum Configuration:

Attachable to the 5322 are:

- Up to two printers 5217, 5241, or 5242.
- Single or dual additional diskette drives with the 5246 Diskette Unit.
- High performance, fixed disk storage with the 5247 Disk Storage Unit.

Up to two 5322 Computers can be included in a configuration by attachment to a shared function model of the 5246 Diskette Unit (mdls 21 or 22) or the 5247 Disk Storage Unit.

Prerequisites: Every System/23 must have a diskette storage facility available for system support and maintenance diagnostic support purposes. Therefore, each 5322 must have either the Integrated Diskette Controller (#3780), the 5246 Diskette Unit Controller (#3775), the Extended 5246 Controller (RPQ 8N5008), or the 5247 Disk Unit Adapter Controller (#3770).

Word Processing system configurations must have at least .6MB of diskette capacity available in order to use the word processing licensed program (5715-WP1). See "Special Features" for a description of limitations and prerequisites.

HIGHLIGHTS

- User-oriented system design.
- Wide choice of main memory and diskette storage options provide configuration flexibility to satisfy specific customer requirements.
- Integrated high level interactive language - BASIC.
- Easy-to-use, adjustable typewriter-like keyboard with numeric keypad and control keys.
- Full screen processing ability with 1920-character CRT display screen.
- Customer Support Function diskettes provide easy start-up and simplified diskette data handling.
- Optional word processing capability.
- Dual workstation capability.
- Flexible communications adapter feature and licensed program for either asynchronous or binary synchronous operations.
- Field upgrades provide for future system growth.

Standard Features

Processor: Main storage is available in 32K, 64K, 96K, or 128K bytes (12K bytes of which are permanently allocated for use by the BASIC language interpreter, display, printer and diskette buffers). Main storage cycle time is 975 nanoseconds with internal parity checking. All features and mdl upgrades (see "Model Conversions") are field installable. One printer attachment is standard on all mdls and three special feature slots are provided on the Data Processing mdls (1XX). Two special feature slots are provided on the combined Data and Word Processing mdls (4XX).

Diskette Capability: Two types of diskette drives are supported by the 5322 Computer; a diskette that can read/write IBM Diskette 1 (5322 mdls XX1 and XX2) and a diskette drive which can read/write IBM Diskette 1, 2, and 2D (5322 mdls XX3 and XX4 or the 5246 Diskette Drive). The 5322 uses the 512 byte format when operating under the BASIC language. However, the Customer Support Functions can use other formats to copy files for data interchange purposes. The possible formats for the diskettes are:

Diskette	Format	Bytes/ Sector	Capacity
1	1	128	*243KB
1	2	512	303KB
2	3	128	*486KB
2	4	512	606KB
2D	5	256	985KB
2D	6	512	1136KB

* Basic Exchange format

For diskette data exchange with other systems, the following exchange types are supported: Basic Exchange (Formats 1 and 3 above) and H Exchange (Format 5 above). Diskettes can be interchanged with other IBM systems and devices which support a compatible diskette exchange type. Data exchange with other system types may require code translation for character set integrity.

Examples are the System/3, System/32, System/34, System/36, System/38, Series/1, S/370, 303X, 4300, 3540, 3740, 3747, 3790, 5110, 5120, 5230, 5260, and 8100.

5322 Computer (cont'd)

The instantaneous data transfer rate using IBM Diskette 1 or 2 is up to 31.2K bytes/sec, and for IBM Diskette 2D is up to 62.5K bytes/sec. Rotational speed of both types of drives is 360 rpm.

For information on System/23 diskette operations, see *System/23 Customer Support Functions Volume I* (SA34-0175), *BASIC Language Reference Manual* (SA34-0109).

BASIC Language: The System/23 BASIC Language Interpreter provides convenient and powerful facilities and features for the development and execution of application programs. Among these facilities are:

- Residence in read-only storage requiring no control program load.
- Improved program diagnostic tools, such as the TRACE statement.
- Several new functions, statements and commands to simplify:
 - Character String Processing
 - Error Recovery
 - File Processing and Management
 - Printer Control
 - Display/Keyboard Processing
 - Procedure Control
- File sharing between two 5322 computers.
- Fully overlapped printing and program execution.
- Encyclopedia format reference manual with extensive cross referencing, examples and in-depth description of system function.

Word Processing (WP): The Word Processing mdls consist of additional logic and microcode hardware to be used in conjunction with one of the System/23 Word Processing licensed programs to provide word processing capabilities. Word processing requires a minimum of 64K of main storage and .6MB of diskette storage. See the programming pages for Word Processing systems requirements.

Some functions supported by the Word Processing hardware and licensed programs to create, edit, print, etc., are:

WP (5715-WP1)

- Input
 - Create document
 - Formats
 - Automatic word wrap
- Edit
 - Delete
 - Find
 - Indent
 - Block operations
 - Word underscore glossary
 - Page delete/restore
- Merge
 - DP/WP merge
- Pagination
 - Character and line count
 - Syllable hyphen control
 - Page end control
- Document
 - Copy document
 - Delete document
 - Change document profiles
 - List drive contents

For further information on Word Processing, see the System/23 programming pages (5715-WP1) or the *Word Processing Operator Reference Manual* (SA34-0613).

The keyboard has a familiar typewriter-like layout plus a numeric keypad. Four arithmetic function keys (+, -, *, /) located above the numeric pad provide convenient entry of data in desk calculator mode. Many of the keys in the top row provide system commands when depressed in connection with the COMMAND key. Special BASIC command words can be entered via the keys in conjunction with the COMMAND key. Thus, the COMMAND key can be used to reduce keying time. The keys on the 10-key keypad can also be defined by the user to perform special functions and may be activated with the COMMAND key under program control.

A variety of different language keyboard layouts may be specified when the machine is ordered. For user reference, a Keyboard Aid (SX34-

0051) (language and keyboard dependent) is supplied with each 5322. This aid is a set of plasticized printed cards that will lie above the top row of keys, and contain:

- Selected BASIC keywords.
- Operator Commands and user-defined function keys.
- Operator messages for each action code.
- Non-native language characters and block graphics.

See "Keyboard/Keyboard Aid/Publications Set" in the "Specify" section. A single specify code is used to order the desired Keyboard/Keyboard Aid.

Display: The screen (CRT) displays keyed input, output, and provides user guidance. Up to 1840 characters can be displayed, 23 lines of 80-characters each. The 24th line is used to report status and system information. The user is permitted full screen management and display of upper/lower case characters. The size of a full screen display is 205mm (8.1 inches) by 160mm (6.3 inches). At any time, 128 different character images may be displayed in addition to 11 block graphics for presentation of blocks, bar charts, frames, etc. User-controlled field attributes are underline, blink, reverse image, high intensity, and non-display. The cursor can be positioned at any input field and optional field attributes of automatic advance and automatic enter are also available.

Character Sets: (Not applicable to machines with specify #2973, Japanese Katakana.) Any one of five Display Character Subsets may be selected from the keyboard (using ALTERNATE keying) because they are all stored within the system. This selection has no effect on internal data representation but, affects only the set of displayed graphics. This "internally stored" language capability is significant because any 5322 can utilize all five Display Character Subsets. The stored character sets are:

1. US, Canada-English
2. Canada-French
3. European countries (except Spain)
4. Nordic (including Iceland)
5. Spain and Spanish speaking countries

The primary set of display graphics at "Power On" is set at the plant of manufacture based upon the keyboard specified. See the *Basic Language Reference* (SA34-0109) for further details. For character sets that may be printed, see the appropriate printer pages.

Printers: Each 5322 may attach up to two 5241 or 5242 table-top impact matrix printers. The first printer attachment is standard and the Second Printer Attachment (#6350) is optional. The optional Second Printer Attachment (#6350) must be installed if the 5217 printer is attached. Either attachment may be used with the 5217, 5241, or 5242 Printers. The 5241 provides printing speeds of 80 characters per second and the 5242 provides 160 characters per second. In addition, the 5242 mdl 2 provides the capability of quality printing at 40 cps. Quality print provides additional matrix dots per character and is suitable for applications such as letter writing which require typewriter-like quality. See the pages for operating characteristics.

Communications

System Communications: System/23 may communicate with the following systems:

Systems	BSC	Asynchronous
Series/1 (EDX, RPS)	X	X
System/3	X	
System/23	X	X
System/34	X	
System/36	X	
System/38	X	
5110/5120	X	
5280	X	
5265	X	

Using Asynchronous Communications, System/23 can communicate with S/370, mdls 135-168, 3031, 3032, 3033, 3081, or 4300 via 3704/3705-EP Release 3.0 to VM/370, using the American National Standard Code for Information Interchange (ASCII) translate table and the Asynchronous Communication Terminal function of the licensed program. The 3135 and 3138 attach via ICA to VM/370 and the 4331 attaches via CA to VM/370. System/23 attachment to VM/370 is provided through VM/System Product, VM/Basic Systems Extension and VM/System Extensions Program Products with VM/370 Release 6 PLC 4 level or higher.

5322 Computer (cont'd)

System/23 is supported for attachment to S/370 mdls 115-168, 3031, 3032, 3033, 3081, and 4300 through CICS/VS using BTAM under VSE, VS1 or MVS. 3741 BSC protocol is provided for communications using point-to-point leased or switched facilities via ICA or CA (where applicable), or 3704/3705. In particular, support is provided for the following CICS/VS release/versions:

CICS/DOS/VS	Version 1.5	On VSE/AF	Release 2
CICS/OS/VS	Version 1.5	On VS1	Release 7
CICS/OS/VS	Version 1.5	On MVS	Release 3.8

Asynchronous Communications: Asynchronous communication is provided by the licensed program (5715-AC1). The physical interface is EIA RS-232-C/CCITT V24-V28. Transfer of data is via American National Standard Code for Information Interchange (ASCII). Auto-answer is supported in a switched network.

The ASCII code and the asynchronous communication interface allows System/23 to communicate with the above mentioned processors using a capability that is commonly referred to as TTY-compatible. Various communications options, such as line speed and parity bits, can be selected by the customer.

The communications are via start/stop on point-to-point facilities. For communications to VM/370, the facilities are full duplex, switched up to 300 bps. Series/1 support is half duplex, switched facilities up to 300 bps. For communication to another System/23, the facilities are full or half duplex, switched or nonswitched, up to 1200 bps.

Binary Synchronous Communications: The licensed program (5715-BC1) supports data transmission rates up to 4800 bps and is implemented to support the line protocol of the 3741. This protocol is supported for point-to-point on switched or nonswitched lines. For communication to another System/23 or 5265 in point-to-point configurations, one System/23 is required to act as a primary station. For all other configurations, the System/23 is the secondary station. Transfer of data is in EBCDIC in either non-transparent or transparent mode. The physical interface is EIA RS-232-C/CCITT V.24-V.28 with clocking supplied by modem.

One of the IBM modems, 3863 (2400 bps), 3864 (4800 bps), 3872 (2400 bps), or 3874 (4800 bps) may be attached to the Communications Adapter Feature (#2550). For more information on the capabilities of these modems refer to M3863 or 3864 and 3872 pages.

Additional Information: Communications facilities attachments for the Communication Adapter Feature (#2550) are designed to operate on transmission facilities such as:

- Common carrier leased telephone line service (voice grade) (Canada only) AT&T or Western Union Class 3002 (to 4800 bps) +/-.
- Voice grade (common carrier or private) lines supporting a 4800 bps transmission rate. Channel requirements may vary according to the data circuit terminating equipment selected. The data circuit terminating equipment manufacturer should be consulted by the customer for this information.
- Common carrier switched network telephone (voice grade) service at up to 4800 bps.
- Private (customer-owned) communications facilities equivalent to the above common carrier facilities.

References:

See M2700 pages for additional information concerning communication facilities, machine attachment requirements, operating capabilities, and customer responsibilities.

Refer to *System/23 Communications Guide* (SA34-0111) for further details.

See appropriate programming pages for requirements relating to System/23 licensed programs (5715-AC1, 5715-BC1).

Customer Responsibilities: The marketing representative must advise the customers of their responsibilities before receipt of the machine:

- They are responsible for making arrangements for installation, pricing and charges for the data communication facility and attachment of selected data sets.
- They are responsible for paying toll charges, if required for installation and/or maintenance of the Communications Adapter Feature (#2550).
- The IBM Marketing Representative must have the customer obtain a firm installation date for transmission services (including modems) before the order for Communications Adapter Feature (#2550) can be confirmed.
- The customer is responsible for providing a desk or table to support System/23 table-top units.

For further information, refer to the M2700 pages.

Customer Support Functions: Customer Support Functions are commonly used system functions distributed with the 5322 on diskette and are also utilized as part of power-up procedures. The functions provided include:

- A loader for machine updates.
- Diskette preparation.
- Alternative collating sequences.
- Diskette-to-diskette copy.
- Diskette compression to another diskette.
- Diskette recovery.
- Index file generation.
- Label display.
- An Audible Alarm to signal operator attention required and, under program control, operator messages such as "end of job."
- Twenty-four Hour Time Clock and Date functions that are set by the operator when starting up the system.
- A sort function is also provided on the CSF diskette as a special feature.

See "Special Features" section and *System/23 Customer Support Functions* (SA34-0175 and SA34-0176) for more details.

Customer Set-Up (CSU): The 5322 is designated for Customer Set-up. Setup details can be found in *Introducing System/23* (GA34-0106).

SPECIFY

- Voltage (AC, 1-phase, 3-wire grounded):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911*
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803
	240V #9914

* Only power available in Canada.

- Color: Pearl White.
- Power Plug: A molded cord set including the appropriate plug is supplied with each machine. For a power cord with a standard plug, specify #2709 (for certain countries). See *Introducing System/23* (GA34-0106) for graphic of plug that will be furnished. If a standard plug is not desired for your customer, specify #2710 for a power cord without a plug. Specify #2710 is not available in Australia.
- Power Cables: Standard power cord is 2.4m (8 feet).
- Adapter Cables: A 6m (19.8 foot) modem cable for communications features is standard. (Japan only) Specify #2946 for adapter cable to satisfy the NTT's DTE self test requirement for Japan. +)

5322 Computer (cont'd)

- Keyboard/Keyboard Aid/Publications Set: Publication Set includes:
 - Set-up Instructions.
 - Learning to Use System/23.
 - Operator Reference.
 - Messages.
 - Customer Support Function Volumes I and II.
 - Diskette(s) containing Customer Support Functions.
 - Diskette(s) containing Operator Training
- (Machine-readable material above may be combined in one or more diskettes).

Keyboard	Keyboard Aid	Publication Aid	Specify
Australia	English	English	#2985
Canada-English	English US	English	#2978
Canada-French	French	French (1)	#2977
English	English US	English US	#2985
France AZERTY	French	French	#2964
France QWERTY	French	French	#2970
International	Dutch	Dutch (2)	#0050
International	English	English	#2950
Italy	Italian	Italian	#2968
Japan	Japanese	Japanese (3)	#2973
Spain/Spanish speaking	Spanish	Spanish	#2969

- (1) Customer Setup Publication and Learning to Use System/23 in Canadian French.
- (2) Learning to Use System/23, Customer Support Function Manuals, Volumes I and II, and Operator Training Diskette in English.
- (3) Character set is based on Japanese Katakana Table. Contains 126 characters plus 11 block graphics. Field Installation: No. Limitation: Not available on 4XX mdls.

For an alternate/additional keyboard aid or Customer Setup Publications, contact your Country Literature Coordinator.

SPECIAL FEATURES

All features may be field installed.

Communications Adapter Feature (#2550): Communications interface hardware and System/23 Licensed Programs (5715-BC1 for BSC and/or 5715-AC1 for ASC) have been combined to provide a flexible, easy-to-use communications facility for System/23.

The licensed programs give the user the ability to tailor the communications function to meet their specific requirements through the use of a step-by-step prompting procedure. These programs also provide a user-programmable interface through BASIC language statements and commands. These interactive programs and the accompanying documentation are available only in English and Japanese. For further information see "Communications", the appropriate programming pages (5715-BC1 or 5715-AC1), or *System/23 Communications Guide* (SA34-0111). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** One available feature slot on the 5322. **Specify:** #2946 for adapter cable to satisfy the NTT's DTE self test requirement for Japan.

5246 Diskette Unit Controller (#3775): [NO LONGER AVAILABLE] Provides direct connection and control function of any mdl of 5246 to any mdl of the 5322. It also provides the function of the Integrated Diskette Controller (#3780) for integrated diskette drives. Either this feature or the Extended 5246 Controller (RPQ 8N5008, NO LONGER AVAILABLE) is required on mdls with no integrated diskettes. No feature slot required. **Limitations:** Mutually exclusive with #3780 and RPQ 8N5008 (NO LONGER AVAILABLE). **Maximum:** One. **Field Installation:** Yes.

Integrated Diskette Controller (#3780): Provides control function for diskette drives that are integral to mdls XX1, XX2, XX3 or XX4 of the 5322. Either this feature or the 5246 Diskette Unit Controller (#3775) or the Extended 5246 Controller (RPQ 8N5008, NO LONGER AVAILABLE) is required with every 5322. No feature slot required. **Limitations:** Mutually exclusive with #3775 and RPQ 8N5008 (NO LONGER AVAILABLE). **Maximum:** One. **Field Installation:** Yes.

Disk(ette) Sort Feature (#6300): Provides the 5322 Computer user with the ability to sort disk(ette) data files. Both full record sorts and address out (ADDROUT) sorts are possible. This function is shipped on the Customer Support Functions diskette when ordered with the 5322. See *Customer Support Functions* (SA34-0175) for details. **Limitations:** This feature or the No Disk(ette) Sort (#9300) feature must be ordered for every 5322. **Maximum:** One. **Field Installation:** Yes.

Second Printer Attachment (#6350): This feature allows the attachment of a second printer which may be either a 5241 or 5242 mdl 1 or 2, and is required for attachment of the 5217. The hardware attachment is identical for all three printers. Output may be directed to a second printer by specifying it in a PRINT statement following a FILE OPEN statement for that printer. This feature is attractive for specific applications in that no physical changing of forms, etc., is required to run a priority interim job such as a management summary report or a short job requiring quality print using a 5242 mdl 2. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** One available feature slot in the 5322.

Extended 5246 Controller (RPQ 8N5008): [NO LONGER AVAILABLE] Provides the function of the 5246 Diskette Unit Controller (#3775) plus the capability to locate one 5322 (in a Dual Configuration only) up to 60m (200 feet) from the attached 5246. **Limitations:** Not available on XX0 mdls. Mutually exclusive with 5246 Diskette Unit Controller (#3775) or Integrated Diskette Controller (#3780). **Maximum:** One. **Prerequisites:** RPQ 8N5009 or 8N5023 on the attached 5246 and Extended Cable RPQ SW2901, SW2902 or SW2903, or equivalent. Requires one available feature slot on the 5322.

TERMS and CONDITIONS

Plan Offering: Purchase only	CSU: Yes
Purchase Option: 70%	Pre-Installation Test Allowance:
Machine Group: D	None
Warranty: B	Volume Purchase Plan: Available
Per Call: 2	Purchase Pilot Test Plan: Available
Educational Allowance: Yes	

MODEL CONVERSIONS (None)
ACCESSORIES

Diskettes: For Diskettes see IBM. See *Customer Support Function Vol. I* (SA34-0175) to determine diskette type (1, 2, 2D) required.

5324 COMPUTER

PURPOSE

The System/23 is a compact data processing system designed with many functions intended to simplify use by first-time computer users. It is a distributed logic system architecturally structured to support file sharing by multiple workstations. Function-oriented hardware combined with licensed programs provide the additional capabilities of word processing and a flexible communications facility. A significant standard function of System/23 processors is an interpretive BASIC language processor which provides an integrated, high level, interactive language designed for commercial data processing applications. The 5324 Computer is a processor unit for the System/23. It is a compact, floor-standing unit convenient for office environments, and contains the processor, integrated diskette units (optional), power supply, and space for optional attachments.

The Display Module (#1000) and Keyboard Module (#1020) are compact, table-top units which are cable-connected to the 5324 computer. This modularity allows flexible unit positioning and, when combined with the adjustments on these modules, provides maximum individual workstation convenience considering variations in system use, operator size, posture, furniture dimensions, or lighting conditions.

MODELS

The model number of the 5324 Computer is determined by the function, memory size, and integrated diskette capability as follows:

Mdl	Main Storage	Diskette Capacity	Number of Drives
Data Processing Models			
120	64KB	OMB	0
123	64KB	1.1MB	1
124	64KB	2.2MB	2
140	128KB	OMB	0
143	128KB	1.1MB	1
144	128KB	2.2MB	2
Data Processing and Word Processing* Models			
420	64KB	OMB	0
423	64KB	1.1MB	1
424	64KB	2.2MB	2
440	128KB	OMB	0
443	128KB	1.1MB	1
444	128KB	2.2MB	2

* See Word Processing System Requirements in the programming pages.

The first digit of the model number indicates Data Processing function only (1XX) or Data Processing and Word Processing (4XX). The second digit of the model number indicates main storage size, and the third digit indicates the number of diskette drives and their capacity.

One diskette drive is required in a system configuration for Customer Support Functions and maintenance.

Maximum Configuration: Attachable to the 5324 are:

- Up to two Printers (5217, 5241, or 5242 in any combination).
- High performance, fixed disk storage with the 5247 Disk Storage Unit.

Multiple 5324 or 5322 Computers can be included in a configuration by attachment to the 5247 Disk Storage Unit.

HIGHLIGHTS

- Flexible modular structure for maximum operator convenience.
- Wide choice of main memory and diskette storage options provide configuration flexibility to satisfy specific customer requirements.
- Integrated high level interactive language - BASIC.
- Easy-to-use, adjustable typewriter-like keyboard module with numeric keypad and control keys.
- Full screen processing ability with 1,920-character CRT display module screen.
- Customer Support Function diskettes help provide easy start-up and simplified diskette data handling.
- Optional word processing capability.
- Multiple workstation capability.
- Flexible communications adapter feature and licensed program for either asynchronous or binary synchronous operations.
- Field upgrades provide for future system growth.

Components

Processor: Main storage is available in 64K, or 128K bytes (12K bytes of which are permanently allocated for use by the BASIC language interpreter, display, printer and diskette buffers). Main storage cycle time is 975 nanoseconds with internal parity checking. All features and mdl upgrades (see "Model Conversions") are field installable. One printer attachment is standard on all mdls and three special feature slots are provided on the Data Processing mdls (1XX). Two special feature slots are provided on the combined Data and Word Processing mdls (4XX).

Every System/23 5324 or 5322 Computer must have a disk or diskette storage facility available for system support and maintenance diagnostic support purposes. Therefore, each 5324 or 5322 must have either the Integrated Diskette Controller (#3780), the 5246 Diskette Unit Controller (#3775), the Extended 5246 Controller (RPQ 8N5008), or the 5247 Disk Unit Adapter (#3770). See "Special Features" for a description of limitations and prerequisites.

Diskette Capability: The type of diskette drive supported by the 5324 Computer can read/write IBM Diskette 1, 2, and 2D (5324 mdls XX3 and XX4). The System/23 uses the 512 byte format when operating under the BASIC language. However, the Customer Support Functions can use other formats to copy files for data interchange purposes. The possible formats for the diskettes are:

Diskette	Format	Bytes/ Sector	Capacity
1	1	128	*243KB
1	2	512	303KB
2	3	128	*486KB
2	4	512	606KB
2D	5	256	985KB
2D	6	512	1136KB
	* Basic Exchange Format		

For diskette data exchange with other systems, the following exchange types are supported: Basic Exchange (Formats 1 and 3 above) and H Exchange (Format 5 above). Diskettes can be interchanged with other IBM systems and devices which support a compatible diskette exchange type. Data exchange with other system types may require code translation for character set integrity. Examples are the System/3, System/32, System/34, System/38,

Series/1, S/370, 303X, 4300, 3540, 3740, 3747, 3790, 5110, 5120, 5230, 5260, and 8100.

The instantaneous data transfer rate using IBM Diskette 1 or 2 is up to 31.2K bytes/sec, and for IBM Diskette 2D is up to 62.5K bytes/sec. Rotational speed of both types of drives is 360 rpm.

For information on System/23 diskette operations, see System/23 Operator Reference (SA34-0108), System/23 Customer Support Functions, Volume I (SA34-0175), or BASIC Language Reference Manual (SA34-0109).

BASIC Language: The System/23 BASIC Language Interpreter provides convenient and powerful facilities and features for the development and execution of application programs. Among these facilities are:

- Residence in read-only storage requiring no control program load.
- Program diagnostic tools, such as the TRACE statement, status line, and split-screen mode for operator intervention in error situations.
- Several new functions, statements and commands to help simplify:
 - Character String Processing
 - Error Recovery
 - File Processing and Management
 - Printer Control
 - Display/Keyboard Processing
 - Procedure Control
- File sharing between multiple System/23 processors.
- Overlapped printing and program execution.
- Encyclopedia format reference manual with extensive cross referencing, examples and in-depth description of system function.

Word Processing (WP): The Word Processing mdls provide additional logic and microcode hardware to be used in conjunction with one of the System/23 Word Processing licensed programs to provide word processing capabilities. See the programming sales pages for Word Processing systems requirements.

Some functions supported by the Word Processing hardware and licensed programs to create, edit, print, etc., are shown below. Word Processing II (5715-WP2) licensed program provides all of the functions shown for Word Processing (5715-WP1), plus those shown in the Word Processing II column.

WP (5715-WP1)	WP II (5715-WP2)
Input	
Create document	Get page/ display
Formats	
Automatic word wrap	
Edit	
Delete	Spelling verification
Find	Spelling assistance
Indent	Automatic hyphenation
Block operations	Synonym assistance
Word underscore	Phrase glossary
glossary	Column alignment
Page delete/ restore	right, center and decimal
	Page GOTO
	Page split
Merge	
DP/WP merge	DP/WP merge

Pagination
Character and
line count
Syllable hyphen
control
Page end control
Document
Copy document

Delete document

Change document
profiles
List drive contents

with multiple
record types
BASIC language
operations
Display files

Widow line
control
Keep

Operator
personal-
ization
Change
document
profiles

For further information on Word Processing function, and system requirements, see the System/23 programming sales pages or the Word Processing Operator Reference Manual (SA34-0613).

Keyboard Module: The Keyboard Module (#1020) is connected to the 5324 Computer by a 1.8m (6 ft) cable, which may be routed under the Display Module. The keyboard has a palm rest beneath the keys and space for the Keyboard Aids above the keys. A slope adjustment mechanism at the top of the keyboard allows positioning for individual comfort and convenience. One Keyboard Module is required for each 5324.

The keyboard has a familiar typewriter-like layout plus a numeric keypad. Many of the keys in the top row provide system commands when depressed in connection with the COMMAND key. Special BASIC command words can be entered via the keys in conjunction with the COMMAND key. Thus, the COMMAND key can be used to reduce keying time. The keys on the 10-key keypad can also be defined by the user to perform special functions and may be activated with the COMMAND key under program control.

A variety of different language keyboard layouts may be specified when the machine is ordered. For user reference, a Keyboard Aid (SX34-0051) (language and keyboard dependent) is supplied with each 5324 Computer. This aid is a set of plasticized printed cards that will lie above the top row of keys, and contain:

- Programmer Commands.
- Operator Commands.
- Operator action codes.
- Additional language characters and other symbols.

See "Keyboard/Keyboard Aid/Publications Set" in the "Specify" section. A single specify code is used to order the desired Keyboard/Keyboard Aid.

Display Module: The Display Module (#1000) is a compact, desk-top unit connected to the 5324 Computer by two 1.8m (6 ft) cables. With a minimum of effort, vertical height and screen angle may be adjusted for variations in workstation layout, display usage, lighting conditions, and operator preference.

The screen displays keyed input, output, and provides user guidance. Up to 1840 characters can be displayed, 23 lines of 80-characters each. The 24th line is used to report status and system information. The user is permitted full screen management and display of upper/lower case characters. At any time 127 different character images may be displayed in addition to 11 block graphics for presentation of blocks, bar charts, frames, etc. User-controlled field attributes are underline, blink, reverse image, high intensity, and non-display. The cursor can be positioned at any input field and optional field attributes of automatic advance and automatic enter are also available.

Character Sets: (Not applicable to machines with specify #2973 Katakana, Japanese.) Any one of five Display Character Subsets

may be selected from the keyboard (using ALTERNATE keying) because they are all stored within the system. This selection has no effect on internal data representation but, affects only the set of displayed graphics. This "internally stored" language capability is significant because any 5324 can utilize all five Display Character Subsets. The stored character sets are:

1. US, Canada-English
2. Canada-French
3. European countries (except Spain)
4. Nordic (including Iceland)
5. Spain and Spanish speaking countries

The primary set of display graphics at "Power On" is set at the plant of manufacture based upon the keyboard specified. See the Basic Language Reference (SA34-0109) for further details. For character sets that may be printed, see the appropriate printer pages.

Printers: Each 5324 Computer may attach up to two printers. The first printer attachment is standard and the Second Printer Attachment (#6350) is optional. The optional Second Printer Attachment must be installed if the 5217 Printer is attached. The 5217 may then be attached to either printer attachment. The 5241 or 5242 may be attached to either attachment without restriction. (See the M5217 5241, and 5242 pages for operating characteristics.)
Communications

System Communications: System/23 may communicate with the following systems:

Systems	BSC	Asynchronous
Series/1 (EDX, RPS)	X	X
System/3	X	
System/23	X	X
System/34	X	
System/36	X	
System/38	X	
5110/5120	X	
5265	X	
5280	X	

Using Asynchronous Communications, System/23 can communicate with S/370, models 135-168, 3031, 3032, 3033, 3081, or 4300 via 3704/3705-EP Release 3.0 to VM/370, using the American National Standard Code for Information Interchange (ASCII) translate table and the Asynchronous Communication Terminal function of the licensed program. The 3135 and 3138 attach via ICA to VM/370 and the 4331 attaches via CA to VM/370. System/23 attachment to VM/370 is provided through VM/System Products, VM/Basic System Extensions and VM/System Extensions Program Products with VM/370 Release 6 PLC 4 level or higher.

System/23 is supported for attachment to S/370 Models 115-168, 3031, 3032, 3033, 3081, 4300 through CICS/VS using BTAM under VSE, VS1 or MVS. 3741 BSC protocol is provided for communications using point-to-point leased or switched facilities via ICA or CA (where applicable), or 3704/3705. In particular, support is provided for the following CICS/VS release/versions:

CICS/DOS/VS Version 1.5 - On VSE/AF Release 2
CICS/OS/VS Version 1.5 - On VS/1 Release 7
CICS/OS/VS Version 1.5 - On MVS Release 3.8

Asynchronous Communications: Asynchronous communication is provided by the licensed program (5715-AC1). The physical interface is EIA RS-232-C/CCITT V24-V28. Transfer of data is via American National Standard Code for Information Interchange (ASCII). Autoanswer is supported in a switched network.

The ASCII code and the asynchronous communication interface allows System/23 to communicate with the above mentioned processors using a capability that is commonly referred to as TTY-compatible. Various communications options, such as line speed and parity bits, can be selected by the customer.

The communications are via start/stop on point-to-point facilities. For communications to VM/370, the facilities are full-duplex,

switched up to 300 bps. Series/1 support is half-duplex, switched facilities up to 300 bps. For communication to another System/23, the facilities are full- or half-duplex, switched or nonswitched, up to 1200 bps.

Binary Synchronous Communications: The licensed program (5715-BC1) supports data transmission rates up to 4800 bps and is implemented to support the line protocol of the 3741. This protocol will be supported for point-to-point on switched or nonswitched lines. Autoanswer is supported on a switched line. Transfer of data is in EBCDIC in either non-transparent or transparent mode. The physical interface is EIA RS-232-C/CCITT V24-V28 with clocking supplied by modem.

One of the IBM modems, 3863 (2400 bps), or 3864 (4800 bps), 3872 (2400 bps) or 3874 (4800 bps), may be attached to the Communications Adapter (#2550). For more information on the capabilities of these modems refer to M3863, 3864, and 3872 pages.

Customer Responsibilities: The customers must be advised that:

- They are responsible for making arrangements for installation, pricing and charges for the data communication facility and attachment of selected data sets.
- Toll charges, if required for installation and/or maintenance of the Communications Adapter (#2550), are to be paid by the customer.
- The IBM Marketing Representative must have the customer obtain a firm installation date for transmission services (including modems) before the order for Communications Adapter (#2550) can be confirmed.

For further information, refer to the M2700 pages.

Additional Information: Communications facilities attachments for the Communication Adapter (#2550) are designed to operate on transmission facilities such as:

- Common carrier leased telephone line service (voice grade) (Canada only) > AT&T or Western Union Class 3002 (to 4800 bps) <).
- Voice grade (common carrier or private) lines supporting a 4800 bps transmission rate. Channel requirements may vary according to the data circuit terminating equipment selected. The data circuit terminating equipment manufacturer should be consulted by the customer for this information.
- Public switched network telephone (voice grade) service at up to 4800 bps.
- Private (customer-owned) communications facilities equivalent to the above common carrier facilities.

References: See M2700 pages for additional information concerning communication facilities, machine attachment requirements, operating capabilities, and customer responsibilities.

Refer to System/23 Communications Guide (SA34-0111) for further details.

See appropriate programming pages for requirements relating to System/23 licensed programs (5715-AC1, 5715-BC1).

Customer Support Functions: Customer Support Functions are commonly used system functions distributed with the 5324 Computer on diskette and are also utilized as part of power-up procedures. The functions provided include:

- A loader for machine updates.
- Volume preparation (disk or diskette).
- Alternative collating sequences.
- Diskette-to-diskette copy.
- Backup-restore disk.
- Data recovery (disk or diskette).
- Index file generation.
- Label display.

- An Audible Alarm to signal operator attention required and, under program control, operator messages such as "end of job."
- Twenty-four Hour Time Clock and Date functions that are set by the operator when starting up the system.
- A sort function is also provided on the CSF diskette as a Special Feature.

See "Special Features" section and, System/23 Customer Support Functions (SA34-0175 and SA34-0176) for more details.

Customer Setup (CSU): The 5324 Computer is designated for Customer Setup. The marketing representative must advise the customers of their responsibilities before receipt of the machine. Setup instructions are shipped with the 5324. The customer is responsible for providing a desk or table to support System/23 table-top units. The CSU Allowance is

Physical Planning Information:

Unit	Height	Width	Depth	Wgt	Max BTU KVA /HR
5324 Cptr	660mm (26in)	310mm (12in)	493mm (20in)		
Mdl X0				26kg (58lb)	.13 132
Mdl XX3				32kg (71lb)	.19 338
Mdl XX4				39kg (87lb)	.24 507
Dsply Module #1000	353- 488mm (14- 20in)	425mm (17in)	330mm (13in)	20kg (54lb)	NA 307
Keybd Module #1020	36- 71mm (1.5- 2.8in)	487mm (19in)	249mm (10in)	4kg (9lb)	NA 5

See Introducing System/23 (GA34-0106) for other physical planning information.

SPECIFY

- Voltage (AC, 1-phase, 3-wire grounded):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911*
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803
	240V #9914

* Only power available in Canada.

- Power Plug: A molded cord set including the appropriate plug is supplied with each machine. Specify #2709 for a power cord with a standard plug (for certain countries). See "Introducing System/23" (GA34-0106) for graphic of plug that will be furnished. If a standard plug is not desired for your customer, specify #2710 for a power cord without a plug. Specify #2710 is not available in Australia, Canada, or New Zealand.
- Color: Pearl White.

- Power Cables: Standard power cord is 2.4m (8 ft). A 6m (19.8 ft) modem cable for communications feature is standard.
- Adapter Cables: Specify #2946 for adapter cable to satisfy the NTT's DTE self test requirement for Japan.
- Keyboard/Keyboard Aid/Publications Set: Publication Set includes:
 - Setup Instructions.
 - Learning to Use System/23.
 - Operator Reference.
 - Messages.
 - Customer Support Function Volumes I and II.
 - Diskette(s) containing Customer Support Functions.
 - Diskette(s) containing Operator Training (Machine-readable material above may be combined in one or more diskettes).

Keyboard	Keyboard Aid	Publicat'n Aid	Specify
Canada- English	English US	English	#2978
Canada- French	French	French (1)	#2977
English	English US	English US	#2985
France (AZERTY)	French	French	#2964
France (QWERTY)	French	French	#2970
Germany	German	German	#2957
Inter- national	Dutch	Dutch (2)	#0050
Inter- national	English	English	#2950
Italy	Italian	Italian	#2968
Japan	Japanese	Jpnese (3)	#2973
Spain/ Spanish Speaking	Spanish	Spanish	#2969

1. "Customer Setup Publication" and "Learning to Use System/23" in Canadian French.
2. "Learning to Use System/23", "Customer Support Function Manuals", Volumes I and II, and "Operator Training Diskette" in English.
3. Character set is based on Japanese Katakana Table. Contains 126 characters plus 11 block graphics. Field Installation: No. Limitation: Not available on 4XX mdls.

- Word Processing Publications: For Word Processing mdls (4XX), or MES upgrades to a 4XX mdl, specify: #9850 for publications supporting 5715-WP1, or #9851 for publications supporting 5715-WP2. If no specify is entered, default will be to #9850. Upgrades from #9850 to #9851 may be ordered via MES.

SPECIAL FEATURES

Display Module (#1000): Provides a free-standing display screen for the 5324 Computer. One required for each 5324 Computer. No feature slot required. Limitations: Not available for MES orders. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Customer setup instructions are included with the 5324.

Keyboard Module (#1020): Provides the keyboard for attachment to the 5324 Computer. One required for each 5324 Computer. No feature slot required. Limitations: Not available for MES orders. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Customer setup instructions are included with the 5324. Specify: One language for the keyboard must be specified and it must be the same as specified for the 5324 Computer. See listing under "Specify" section for available keyboard.

Communications Adapter (#2550): Communications interface hardware and System/23 Licensed Programs (5715-BC1 for BSC and/or 5715-AC1 for ASC) have been combined to provide a flexible, easy-to-use communications facility for System/23. The hardware feature provides the communications interface logic and circuitry, an installation test diskette and cable wrap connector, the System/23 Communications Guide (SA34-0111), and a 6m (19.8 ft) modem cable assembly. The licensed programs give the user the ability to tailor the communications function to meet their specific requirements through the use of a step-by-step prompting procedure. These programs also provide a user-programmable interface through BASIC language statements and commands. These interactive programs and the accompanying documentation are available only in

English, German, and Japanese. For further information see "Communications", the appropriate programming pages (5715-BC1 or 5715-AC1), or System/23 Communications Guide (SA34-0111). Maximum: One. Field Installation: Yes. Prerequisites: One available feature slot on the 5324. Specify: #2946 for adapter cable to satisfy the NTT's DTE self test requirement for Japan.

5247 Disk Unit Adapter (#3770): Provides direct connection and control function for any mdl of the 5247 to any mdl of the 5324 or 5322 Computer. Limitations: If this attachment is for the first or only 5324 or 5322 attached to the 5247, the 5324 or 5322 must have a diskette capability, be attached to the 5247 via the standard 4m cables and be located adjacent to the 5247. Maximum: One. Field Installation: Yes. Prerequisites: One available feature slot in the 5324 or 5322.

Integrated Diskette Controller (#3780): Provides control function for diskette drives that are integral to mdls XX3 or XX4 of the 5324 Computer. Either this feature or the 5247 Disk Unit Adapter (#3770) is required with every 5324. No feature slot required. Maximum: One. Field Installation: Yes.

Disk(ette) Sort Feature (#6300): Provides the 5324 Computer user with the ability to sort disk(ette) data files. Both full-record sorts and address-out (ADDROUT) sorts are possible. This function is shipped on the Customer Support Functions diskette when ordered with the 5324. See "Customer Support Functions" (SA34-0175) for

details. Limitations: This feature or the No Disk(ette) Sort (#9300) feature must be ordered for every 5324. Maximum: One. Field Installation: Yes.

Second Printer Attachment (#6350): This feature allows the attachment of a second printer which may be either a 5241 or 5242 mdls 1 or 2 and is required for attachment of the 5217. The hardware attachment is identical for all three printers. Output may be directed to a second printer by specifying it in a PRINT statement following an OPEN statement for that printer. This feature is attractive for specific applications in that no physical changing of forms, etc., is required to run a priority interim job such as a management summary report or a short job requiring quality print using a 5242 mdl 2. Maximum: One. Field Installation: Yes. Prerequisites: One available feature slot in the 5324.

MODEL CONVERSIONS

Any model processor may be field upgraded to any other model through addition of main storage or diskette drives or diskette drive capacity.

All features may be field installed.

Model conversion features are not CSU.

The upgrade purchase price for model conversion may be greater than the purchase price differentials. Customers should carefully evaluate their requirements prior to purchasing a system.

All replaced parts from model conversions become the property of IBM.

ACCESSORIES

Diskettes: For Diskettes see IBM. See Customer Support Function Vol. I (SA34-0175) to determine diskette type (1, 2, 2D) required.

MACHINES

5340 SYSTEM UNIT

[NO LONGER AVAILABLE]

Although the 5340 is no longer available, model changes, special features, RPQs, and accessories may still be ordered.

PURPOSE

Contains main storage, disk storage, diskette drive, facilities for addressing main storage, and logical processing circuits and control for I/O units on System/34.

MODELS

Model	Main Storage	Diskette	Disk Storage Capacity (MB)
A11	32K	Diskette 1	8.6
A12	32K	Diskette 1	13.2
A13	32K	Diskette 1	27.1
A14	32K	Diskette 1	63.9
A15	32K	Diskette 1	128.4
A21	32K	Diskette 2D	8.6
A22	32K	Diskette 2D	13.2
A23	32K	Diskette 2D	27.1
A24	32K	Diskette 2D	63.9
A25	32K	Diskette 2D	128.4
A31	32K	Magazine	8.6
A32	32K	Magazine	13.2
A33	32K	Magazine	27.1
A34	32K	Magazine	63.9
A35	32K	Magazine	128.4
B11	48K	Diskette 1	8.6
B12	48K	Diskette 1	13.2
B13	48K	Diskette 1	27.1
B14	48K	Diskette 1	63.9
B15	48K	Diskette 1	128.4
B21	48K	Diskette 2D	8.6
B22	48K	Diskette 2D	13.2
B23	48K	Diskette 2D	27.1
B24	48K	Diskette 2D	63.9
B25	48K	Diskette 2D	128.4
B31	48K	Magazine	8.6
B32	48K	Magazine	13.2
B33	48K	Magazine	27.1
B34	48K	Magazine	63.9
B35	48K	Magazine	128.4
C11	64K	Diskette 1	8.6
C12	64K	Diskette 1	13.2
C13	64K	Diskette 1	27.1
C14	64K	Diskette 1	63.9
C15	64K	Diskette 1	128.4
C21	64K	Diskette 2D	8.6
C22	64K	Diskette 2D	13.2
C23	64K	Diskette 2D	27.1
C24	64K	Diskette 2D	63.9
C25	64K	Diskette 2D	128.4
C31	64K	Magazine	8.6
C32	64K	Magazine	13.2
C33	64K	Magazine	27.1
C34	64K	Magazine	63.9
C35	64K	Magazine	128.4
C36	64K	Magazine	192.9
C37	64K	Magazine	257.4
D11	96K	Diskette 1	8.6
D12	96K	Diskette 1	13.2
D13	96K	Diskette 1	27.1
D14	96K	Diskette 1	63.9
D15	96K	Diskette 1	128.4
D21	96K	Diskette 2D	8.6
D22	96K	Diskette 2D	13.2
D23	96K	Diskette 2D	27.1
D24	96K	Diskette 2D	63.9
D25	96K	Diskette 2D	128.4
D31	96K	Magazine	8.6
D32	96K	Magazine	13.2
D33	96K	Magazine	27.1
D34	96K	Magazine	63.9
D35	96K	Magazine	128.4
D36	96K	Magazine	192.9
D37	96K	Magazine	257.4
E11	128K	Diskette 1	8.6
E12	128K	Diskette 1	13.2
E13	128K	Diskette 1	27.1
E14	128K	Diskette 1	63.9
E15	128K	Diskette 1	128.4

E21	128K	Diskette 2D	8.6
E22	128K	Diskette 2D	13.2
E23	128K	Diskette 2D	27.1
E24	128K	Diskette 2D	63.9
E25	128K	Diskette 2D	128.4
E31	128K	Magazine	8.6
E32	128K	Magazine	13.2
E33	128K	Magazine	27.1
E34	128K	Magazine	63.9
E35	128K	Magazine	128.4
E36	128K	Magazine	192.9
E37	128K	Magazine	257.4
F22	256K	Diskette 2D	13.2
F23	256K	Diskette 2D	27.1
F24	256K	Diskette 2D	63.9
F25	256K	Diskette 2D	128.4
F33	256K	Magazine	27.1
F34	256K	Magazine	63.9
F35	256K	Magazine	128.4
F36	256K	Magazine	192.9
F37	256K	Magazine	257.4

Minimum System Configuration: A 5340 System Unit, a display/console (5251 mdl 1, 11, or 999, 5252, 5291, or 5292), and printer (serial -- 5219, 5256, ... line -- 5211, 5224, 5225, 5262 or 3262). A system printer must be provided to satisfy IBM maintenance requirements when using System Support Program (5726-SS1) or Preconfigured System Support Program (5726-SS2). Special microcode for the Preconfigured System Support Program (5726-SS2) must also be specified. (Far Eastern Countries only) The ideographic capability requires a minimum configuration of the 5340 System Unit mdl BXX (48K bytes of main storage). In addition, a 5255 Display Station may be used as the system console. +)

HIGHLIGHTS

- Multiple workstation system capability
 - Multiprogramming and printer spooling provided with System Support Licensed Program (5726-SS1)
 - Multiprogramming and printer spooling for entry level systems with Preconfigured System Support Program (5726-SS2)
 - Extension of System/32 capabilities
 - Local and remote workstation attachment flexibility:
 - 5219 Printer
 - 5224 Printer
 - 5225 Printer
 - 5251 Display Station
 - 5252 Dual Display Station
 - 5256 Printer
 - 5262 Printer (local only)
 - 5291 Display Station
 - 5292 Color Display Station
 - I/O units:
 - 1255 Magnetic Character Reader
 - 3262 Printer
 - 5211 Printer
 - 5219 Printer
 - 5224 Printer
 - 5225 Printer
 - 5262 Printer
 - Diskette Magazine Drive
 - Communications capability via BSC or SDLC through attachment of one to four lines
 - Easy-to-use workstation utility programming support available
 - Facilities to provide high-level of system availability
 - Main Storage Failure Recovery
 - Scientific Instruction Set
 - Fixed interval timer
 - Address Translation Registers
 - Storage protection
 - MICR document processing capability
 - 5211/3262 translation tables for character substitution
- (Far Eastern Countries only+)
- Ideographic Support:
 - 5224 Printer mdl 12
 - 5225 Printer mdl 11
 - 5255 Display Station +)

Processor Unit: The main storage processor represents a hardwired System/3 language processor with 32K, 48K, 64K, 96K, 128K, or 256K bytes of main storage. A microprocessor, with 16K words of control storage, operates in parallel with the main storage processor, and supports a microcoded control function and each of the I/O devices.

5340 System Unit (cont'd)

The processor unit uses a combination of LSI/MSI - large and medium scale integration for the logic circuitry. Memory technology is Metal Oxide Semiconductor Field Effect Transistor (MOSFET). Data and instructions are stored as EBCDIC characters. Each EBCDIC character is stored in an 8-bit byte. A ninth bit is added for parity checking. Main storage internal cycle time is 600 nanoseconds.

Workstation Controller: The 5250 Information Display System devices (5251 mdls 1, 11, and 999 Displays, 5252 Dual Displays, 5291 Displays, 5292 Color Displays, and 5219, 5224, 5225, 5256 or 5262 Printers), used as locally attached System/34 workstations, attach to a controller in the 5340 System Unit via four cable connectors on the 5340.

One cable connector must be dedicated to attachment of a 5251 mdl 1, 11, or 999, or 5252, or 5291, or 5292 to be used as the system console.

Note: If the 5291 or 5292 is to be attached to the System/34, the system must be at SSP Release 7 level or higher. Also, if the 5291 or 5292 is to be used as the console the System/34 must be at Diagnostic Release Level 9.2 or higher. For maintenance reasons, only one of the above machine types 5251, 5252 or 5291 should be attached to this cable. A 6m (20 ft) twinaxial cable is provided with the 5340 for attachment of the system console.

Up to three additional cables may be connected to the 5340 for attachment of additional workstation devices. A maximum of 16 display stations and printers (the 5252 counts as two display stations), including the console, may be attached when the optional Workstation Control Expansion B (#4901) is installed. The maximum length of any one cable attached to the 5340 cable connector is 1,525ms (5,000 feet). Multiple workstations (up to seven) may be attached to one cable via the Cable-Thru on the display station or printer (Cable-Thru is a standard capability on the 5291 Display Station). See *IBM System/34 Installation Manual - Physical Planning* (GA21-9242).

(Far Eastern Countries only) Ideographic capability is provided by Workstation Control Expansion C (#4902). It provides for the attachment of the 5225 Printer and the 5255 Display in addition to the 5251 mdls 1 and 11, 5252, and 5256. Workstations are attached through the four cable connectors on the 5340. A maximum of seven workstations may be attached on one cable via the Cable-Thru (#2680). Up to 16 workstations, including the system console, may be attached to the 5340 in any combination. The system console may be a 5251 mdl 1 or 11, 5252, or 5255. +)

Diskette: Included in the mdls X1X of the System Unit is the Diskette 1 drive, mdls X2X incorporate the Diskette 2D drive, and the mdls X3X use the Diskette Magazine drive.

The Diskette 1 drive is capable of reading and writing the Diskette 1 in Basic format or Extended format. The Diskette 2D drive can read and write either the Diskette 1 (Basic or Extended format) or the 2-sided double density Diskette 2D (Basic or Extended format).

The Diskette Magazine drive can process individual diskettes or magazines. The magazine holds up to ten operator accessible diskettes. The magazine drive can accommodate two magazines and three individual diskettes. The selecting of diskettes within a magazine, and proceeding from the first magazine to the second, is automatic (under program control). The magazines will typically be used for Save/Restore functions. The three individual slots may be used for smaller jobs. Selection of up to three individual diskettes is automatic (under program control). Both Diskette 1 (Basic or Extended format) or the 2-sided double density Diskette 2D (Basic or Extended format) can be used in the Diskette Magazine. The select cycle time (eject diskette, move to next diskette, load diskette) is approximately three seconds.

The compatible media for data exchange with other devices such as 3740 is the Diskette 1 in Basic format or the 5280 is the Diskette 1 or 2D in Basic format. The formats for diskettes are:

	Diskette 1	Diskette 2D
Data Tracks/Diskette	74	148 (74 Cylinders)
Capacity		
Basic Format		
Bytes/Sector	128	256
Sectors/Track	26	26
Tracks/Cylinder	1	2
Data Bytes/Diskette	246,272	985,088
Extended Format		
Bytes/Sector	512	1,024
Sectors/Track	8	8
Tracks/Cylinder	1	2
Data Bytes/Diskette	303,104	1,212,416

The data transfer rate for the Diskette 1 drive is 31.2KB/sec; for Diskette 2D drive it is 62.5KB/sec (using Diskette 2D); and for the Diskette Magazine drive it is 125.0KB/sec (using Diskette 2D).

"Read or Write" of diskettes is overlapped with processing and other device functions except disk storage data transfer. All diskette seek operations are overlapped with processing and I/O devices.

Disk Storage: The 5340 System Unit can contain one of seven disk storage capacities. The disk storage is physically non-removable, high speed, direct access media, and the primary processing file in the system. Programs and data are stored on the disk for processing. Data can be stored off-line for security or backup purposes by first copying the data from disk storage to either of the two diskette media. The System/34 with the Diskette 1 drive, the Diskette 2D drive, or the Diskette Magazine drive, plus a multiprogramming capability provide flexible combinations to optimize diskette functions with system disk storage. Disk storage capacities available to the users may be reduced by the installation of optional features.

Disk Storage Specifications:

	8.6MB	13.2MB	27.1MB	63.9MB
Bytes/Sector	256	256	256	256
Bytes/Cylinder	46,080	46,080	46,080	180,224
Disk Spindles	1	1	2	1
Cylinders	187	288	589.33	354.5
Capacity *	8,618,960	13,271,040	27,156,480	63,905,792
Access Time (ms)				
Cyl-to-Cyl	10	10	10	9
Average **	33	38	38	27
Maximum	55	70	70	46
	(201 cyl/ spindle)	(302 cyl/ spindle)	(302 cyl/ spindle)	(359 cyl/ spindle)
Rotational				
Speed (rpm)	2,964	2,964	2,964	3,125
Data Transfer				
Rate (MB/sec)	.889	.889	.889	1.031
		128.4MB	192.9MB	257.4MB
Bytes/Sector		256	256	256
Bytes/Cylinder		180,224	180,224	180,224
Disk Spindles		2	3	4
Cylinders		712.5	1,070.5	1,428.5
Capacity *		128,425,984	192,946,176	257,466,368
Access Time (ms)				
Cyl-to-Cyl		9	9	9
Average **		27	27	27
Maximum		46	46	46
		(359 cyl/ spindle)	(359 cyl/ spindle)	(359 cyl/ spindle)
Rotational				
Speed (rpm)		3,125	3,125	3,125
Data Transfer				
Rate (MB/sec)		1.031	1.031	1.031

* These capacities (available to the user) may be reduced by installation of optional features. See "Limitations" under optional feature MLCA (#4500), and Workstation Control Expansion C (#4902).

** Average of all possible disk accesses.

System Console: A system console is not a component of the 5340 System Unit. The system console may be a 5251 Display Station, mdl 1, 11, or 999 a 5252 Dual Display Station, a 5291 Display Station, a 5292 Color Display Station (Far Eastern Countries only) or a 5255 Display Station +) which is physically attached to the System Unit similar to other locally attached workstation devices. When using the 5291 or 5292 as the system console, the System/34 must be at SSP Release 7 or higher and Diagnostic Release Level 9.2 or higher. For system operation and service reasons, the console is required to be located within 6ms (20 feet) of the System Unit. Its primary use is to facilitate operator control of the system via operator commands and to allow the operator to respond to system messages presented on the display. It may also be used as a data entry/inquiry workstation, interacting with a user application. The mode of operation is easily switched from workstation mode to console mode for servicing system requests.

Customer Responsibilities: The customer must be advised, in writing, of certain responsibilities related to the installation and maintenance of PTT facilities/services as well as the IBM equipment. For further information see M2700 pages.

MACHINES
5340 System Unit (cont'd)

The marketing representative must have the customer obtain a firm installation date for the start of transmission services (including any required modems) prior to processing Order Confirmation.

SPECIFY

- Voltage (AC, 1-phase): One must be specified.

50 Hz	60 Hz
200V #2806	200V #2732
220V #2813	208V #9902
235V #2814	230V #9904

- Color: Pearl white only (no specify code required).
- Communications Cable (with #2500, #3500): Required for attaching System/34 to the communications facility regardless of whether an IBM integrated modem, an external modem, or DDSA is used. Specify #9460 for a 6m (20 ft) cable or #9461 for a 12m (40 ft) cable. Specify this cable only once per system. If two Communications Adapters are installed, the cable length will be the same on both.

The communications cable for MLCA (#4500) will be 12ms (40 feet) for each line. No specify for cable length is required nor can one be made. The cable for the 4800 bps Integrated Modem with Auto-Answer and Integrated Protective Coupler (#536X) will be 5.5ms (18 feet).

- System Console and System Printer Cable: A 6-meter (20-ft) twinaxial cable is included with the system unit for the system console. A 6-meter (20-ft) cable is also included for the system printer if the 5211/3262 Base Printer Attachment Feature (#1110) is not ordered.

- Language Group for System Control Panel:

#2935 Canada French	#2932 Italian
#2750 English	#2930 Japanese
#2928 French	#2931 Spanish
#2929 German	

- System Printer: Specify #9301 if 5211 mdl 1 is attached; #9302 if 5211 mdl 2 is attached; #9303 if 3262 mdl B1 is attached; #9306 or if a 5256 or a 5262 is the system printer (no 5211 or 3262); #9308 if a 5224 is the system printer, or #9307 if a #5225 is the system printer (no 5211 or 3262).
- Up-Ending Kit: (#9845) enables the 5340 to be up-ended for installation or moving purposes. This kit is furnished only as necessary and remains the property of IBM.

(Far Eastern Countries only+)

- Ideographic Character Set: Required if Workstation Control Expansion C (#4902) is installed. Specify #2782 for Chinese character set; #2783 for Japanese Kanji character set. +)
- Multinational Control: Specify #2990 if Multinational Character Set (#2990) is installed on any 5224, 5225, 5251, 5252, 5256 or 5262. **Limitations:** Cannot be installed with Workstation Control Expansion C (#4902). **Field Installation:** Not recommended.
- Microcode in support of Preconfigured System Support Program (5726-SS2): Specify #9850.

Notes:

- I/O Unit Attachments: Appropriate special features are required to attach some I/O units. See "Special Features".
- System Support Licensed Program (5726-SS1): Should be ordered at equipment order entry time. See System Support Program (5726-SS1) for additional information.
- Refer to *IBM System/34 Installation Manual - Physical Planning*, GA21-9242, for physical installation requirements.
- Cables:** The IBM Cabling System shielded twisted-pair cable (or equivalent) or twinaxial cable is required for specific product attachment to the System/34. Only one cable type can be used on a port. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to the *IBM Cabling System-Planning and Installation Guide*, GA27-3361. For problem determination procedures, refer to *IBM Cabling System Problem Determination Guide For Twinaxial Products*, GA21-9491. the System Supplies operation within your country.

Twinaxial Cable: Refer to the M5251, 5292, 5219, 5224, 5225, 5256 or 5262 pages for information. When cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the System/34.

SPECIAL FEATURES
Non-Communications Features

1255 Attachment (#1100): Required to attach 1255 Magnetic Character Reader mdls 1, 2, or 3. **Limitations:** The 1255 attachment cannot operate with the Communications Adapter (#2500, #3500) which has been assigned as the low-priority line. therefore, only the Communications Adapter (#2500, #3500) with the high-priority address can be used while operating the 1255. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** Processor Unit Expansion A and/or E may be required on certain mdls. See "Processor Unit Expansion Feature Configurator" and *IBM System/34 Installation Manual - Physical Planning* (GA21-9242) for cabling information.

1255 Attachment Expansion (#1105): Required when using the System/34 Assembler Macros to provide 1255 stacker logic programs. This feature provides an additional 28K of user programmable storage. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #1100.

5211/3262 Base Printer Attachment (#1110): Required when attaching either the 3262 or the 5211 Printer. **Maximum:** One. **Field Installation:** Yes.

Keylock (#4655): Replaces on/off power switch to protect against unauthorized use. See "Accessories" for information concerning additional keys. **Maximum:** One. **Field Installation:** Yes.

Internal Clock (#4703): Generates synchronizing and timing signals for BSC or SDLC operation when they are not provided by the modem on either Communications Adapter (#2500 or #3500). Clocking speeds available with this feature are 600 bps and 1200 bps. Selection of full or half-speed is indicated via a system utility program. When this feature is installed on System/34, all other BSC or SDLC stations attached to the same data link must also be equipped with a similar IBM Internal Clock feature. See IBM, for determination of the feature's requirement with planned modems. **Limitations:** Cannot be installed with 2400 bps Integrated Modem (#5600, #5602, #5610, #6500, #6602, #6610). **Maximum:** One per system; will handle either or both lines. **Field Installation:** Yes. **Prerequisites:** Communications Adapter (#2500 or #3500), Interface (#3701 or #3702) or 1200 bps Integrated Modem (#5500, #5501, #6500, or #6501).

Workstation Control Expansion A (#4900): Required if Magnetic Stripe Reader (#4910) is installed on any 5251 or 5252 that is locally attached to the 5340. Also required when using the 3270 Device Emulation Licensed Program (5726-EM1). **Limitations:** May not be installed with Workstation Control Expansion B (#4901). **Maximum:** One. **Field Installation:** Yes.

Workstation Control Expansion B (#4901): Required when attaching nine to sixteen 5250 workstations and/or printers locally to the 5340 System Unit. This feature also contains the control necessary if Magnetic Stripe Readers (#4910) are installed on any 5251 or 5252 that is locally attached to the 5340. Also required when using the 3270 Device Emulation Licensed Program (5726-EM1). **Limitations:** May not be installed with Workstation Control Expansion A (#4900). **Maximum:** One. **Field Installation:** Yes.

5340 System Unit (cont'd)

(Far Eastern Countries only+)

Workstation Control Expansion C (#4902): Required when attaching the 5224, 5225 or 5255 directly to the 5340 for ideographic character processing. This feature also contains the control necessary if Magnetic Stripe Readers (#4910) are installed on any 5251, 5252, or 5255 that locally attach to the 5340. Also included is control for locally attaching up to 16 workstations and printers. **Limitations:** May not be installed with Workstation Control Expansion A or B (#4900 or #4901). When installed, this feature will reduce the specified disk capacity by 128,000 bytes. Also, when installed, the System/34 3270 Device Emulation program cannot be operated and the multinational character feature is not supported. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** Processor Unit Expansion B is required on 5340 mdls XX1, XX2, and XX3. Systems/34 SSP (Ideographic Version) is required only if ideographic characters are to be processed. See "Processor Unit Expansion Feature Configurator". **Specify:** In addition to #1402, specify #2782 for Chinese character set; #2783 for Japanese Kanji character set. +)

Internal Clock (#5321): Generates synchronizing and timing signals for BSC or SDLC operation when they are not provided by the modem used with any of the Line Base Adapters on the Multiline Communications Adapter (#4500). Clocking speeds available with this feature are 600 and 1200 bps. Selection of full or half-speed and the appropriate line is indicated via a system utility program. When this feature is installed on System/34, all other BSC or SDLC stations attached to the same data link must also be equipped with a similar IBM Internal Clock feature. See IBM, for determination of the feature's requirement with planned modems. **Maximum:** One per system; will handle one to four lines. **Field Installation:** Yes. **Prerequisites:** #4500 and CCITT Interface or 1200 bps Integrated Modem for the MLCA.

Processor Unit Expansion A (#5732): This is a feature I/O board required for 1255 Attachment (#1100). Not required on XX3 (27.1MB) mdls. **Limitations:** See "Processor Unit Expansion Feature Configurator". **Maximum:** One. **Field Installation:** Yes.

Processor Unit Expansion B (#5733): Additional power for communications. Required for 2400 bps Integrated Modem (#5600, #6600, #5601, #6601, #5602, #6602, #5610, #6610). Not required on XX4, XX5, XX6 and XX7 mdls. **Limitations:** See "Processor Unit Expansion Feature Configurator". **Maximum:** One. **Field Installation:** Yes.

Processor Unit Expansion C (#5734): I/O modem regulator required for Interface (#3701 or #3702), or 1200 bps Integrated Modem, (#5500, #5501, #6500, #6501). Not required on XX4, XX5, XX6, and XX7 mdls. Not required if Processor Unit Expansion B (#5733) is already installed. **Limitations:** Not used with the MLCA (#4500). See "Processor Unit Expansion Feature Configurator". **Maximum:** One. **Field Installation:** Yes.

Processor Unit Expansion D (#5735): Gate Assembly required for 2400 bps Integrated Modem (#5600, #6600, #5601, #6601, #5602, #6602, #5610, #6610). See "Processor Unit Expansion Feature Configurator". **Maximum:** One. **Field Installation:** Yes.

Processor Unit Expansion E (#5736): Additional power required for 1255 Attachment (#1100) on certain mdls. See "Processor Unit Expansion Feature Configurator". **Maximum:** One. **Field Installation:** Yes.

Processor Unit Expansion Feature Configurator:

5340 Mdls					
			X14		
			X15		
			X24		
			X25		
			X34		
			X35		
X11			X36	X31	
X12			X37	X32	X33
X21	X13				
X22	X23				
Attachments					
#1255	A	-	A, E	A, E	E
EIA/1200 IM *	C **	C **	-	C **	C **
2400 IM *	B, D	B, D	D	B, D	B, D
Workstation Control Expansion C					
	B	B	-	B	B

* These IM (Integrated Modem) features apply only to the First or Second Communications Adapter (#2500 or #3500).

** C is not required if both B and 2400 IM are installed.

Notes: Processor Unit Expansion Features required for communications features (CCITT Interface or Integrated Modems) are required only once per system regardless of whether one or two Communications Adapters (#2500 or #3500) are installed.

5211 Printer Attachment (#5811): Required to attach a 5211 Printer mdl 1 or 2. A translation capability provides for use of translation tables for substituting characters when the characters to be printed are not contained on the print belt. **Limitations:** Cannot be installed with 3262 Printer Attachment (#5815). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** See "System Printer" in "Specify" above. 5211/3262 Base Printer Attachment (#1110).

3262 Printer Attachment (#5815): Required to attach a 3262 mdl B1 Printer. A translation capability provides for use of translation tables for substituting characters when the characters to be printed are not contained on the print belt. **Limitations:** Cannot be installed with 5211 Printer Attachment (#5811). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** See "System Printer" in "Specify" above. 5211/3262 Base Printer Attachment (#1110).

Communications Features

Communications Adapters - General: System/34 can attach up to four communications lines depending upon the adapters selected. Three separate adapters are available. The First and Second Communications Adapters (#2500 and #3500) allow one line each to be attached to the system. When these adapters are used, a total of two communications lines can be attached. The Multiline Communications Adapter (MLCA - #4500) can provide for attachment of from one to four communications lines but is mutually exclusive with the First and Second Communications Adapters. The MLCA has up to four Line Base Adapters, each allowing attachment of one line.

Below is a discussion of the communications hardware support: (1) common to both BSC and SDLC, (2) specific to BSC support, and (3) specific to SDLC support.

1. Support Common to Both BSC and SDLC:

Communications Adapters #2500 and #3500 will allow System/34 to communicate on a nonswitched point-to-point or multipoint line at speeds up to 9600 bps and on a switched point-to-point line at speeds up to 4800 bps. Each adapter operates independently under program control; however, the maximum aggregate bit rate for adapters #2500 and #3500 operating concurrently is 9600 bps. The maximum aggregate bit rate for all lines for adapter #4500 is 65,600 bps. When one line operates at 19,200, 48,000, 50,000, or 56,000 bps, the remaining lines are restricted to a total aggregate rate of 9600 bps. See M2700 pages for information on communication facilities.

The System/34 operates as a control station on a multipoint line for the 5251 mdl 2 or 12, 3601, 3694, 4701, System/36, and another System/34, all under SDLC. If the other device on a multipoint line is a control station, the System/34 operates as a tributary station for BSC or a secondary station for SDLC. Otherwise, communication with other devices must be on a point-to-point line only.

Each communications adapter will operate in half-duplex mode over dial (switched network) facilities, and half-duplex mode over nonswitched (or equivalent private) communications lines which may be duplex or half-duplex facilities. Operation of each feature will be overlapped at all transmission rates with processing and/or I/O device operations. See tables below. Units at each termination, or drop point, of a communications line to which the System/34 is attached must use the same clocking source (modem or business machine) and must be set to operate at the same transmission rate and to use the same transmission code. Compatible modems must be used at all terminations on a network and must use the same mode of attachment (2- or 4-wire). Switched network versions include, as a basic capability, support of Manual Dial and Manual or Auto-Answer (where the attached modem supports this capability) operations.

2. Support Specific to BSC Operations:

The communication adapter allows operation in BSC mode as requested by the executing program.

See the System/34 programming pages for a description of the program support provided for this feature. ASCII, EBCDIC, or EBCDIC Text Transparency are standard. ASCII or EBCDIC

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transmission codes are selected at program compilation time. In conjunction with stored program control, this feature permits System/34 to function on a switched or nonswitched communications line as a processor/terminal communicating in binary synchronous mode with:

- A Series/1 equipped with BSCA (#2074, #2075, #2093, or #2094) (as a System/3).
- A System/3 equipped with #2074, #2084, or #2094.
- A System/7 equipped with BSCA (#2074) (as a System/3).
- A System/32 equipped with #2074.
- Another System/34 equipped with #2500, #3500, or #4500.
- A System/36 (5360) equipped with #2500 or #4500.
- A System/36 (5362) equipped with #2910 or #2915.
- A System/38 with appropriately configured BSC adapter and subfeatures, (point-to-point only).
- An S/360 mdl 20 equipped with #2074.
- An S/370 via an Integrated Communications Adapter, a 4331 Communications Adapter, a 2701 Data Adapter Unit, a 2703 Transmission Control Unit, or a 3704/3705 Communications Controller with the Network Control Program (NCP) or the Partitioned Emulation Program (PEP), any of which are equipped with a binary synchronous adapter and appropriate sub-features.
- A 1750 Switching System.
- A 3741 Data Station mdl 2 or 3741 Programmable Workstation mdl 4.
- A 3747 Data Converter equipped with Communications Adapter (#1660).
- A 3750 system equipped with #1450 on the 3751 (nonswitched point-to-point only). See M3750 pages for restrictions.
- A 5110 Computer equipped with BSCA #2074 (as a 3741 mdl 2 or 4).
- A 5231 mdl 2 equipped with BSCA (#2074) (as a 3741 mdl 2 or 4 in transmit mode only).
- A 5265 communicating mdl (point-to-point, batch transmission only).
- A 5280 Distributed Data System equipped with #2500.

3. Support Specific to SDLC Operations:

The communications adapter allows operation in SDLC mode as requested by the executing program. The System/34 provides SDLC communications support for multipoint line control when the 5251 mdl 2 or 12 Display Stations, 3601 Finance Communications Controller, 3694 Document Processor, 4700 Finance Communications System, System/36, or another System/34 are attached to the communications adapter. In conjunction with stored program control, this feature provides communications capability with 4331 Communications Adapter or a S/370, 303X, or 4300 via a 3704 or 3705 Communications Controller equipped with appropriate features. See M3704, 3705, or 4331 pages. Switched network backup and speed select modem features are not supported under program control when communicating with 5251 mdl 2, 12. See the System/34 programming pages for a description of the program support provided on System/34 for SNA/SDLC operations. ASCII support for 5251 mdl 2 or 12 is by RPQ only.

First Communications Adapter - BSC/SDLC (#2500): Required to attach a communications line via appropriate interface or modem. In conjunction with stored program control, this feature permits System/34 to function on a switched, nonswitched public or private communications line. The adapter provides both BSC and SDLC. The proper line protocol is loaded into the control processor at program execution time. The communications adapters (#2500 and #3500) operate at speeds up to 9600 bps on a nonswitched point-to-point or multipoint common carrier facility or equivalent privately owned communication facility and up to 4800 bps on a switched point-to-point facility. However, the aggregate bit rate when both adapters (#2500 and #3500) are operating concurrently is 9,600 bps. **Limitations:** Cannot be installed with Multiline Communications Adapter (#4500). SDLC support by System Support Program (5726-SS1) requires at least 48K bytes of main storage (5340 mdl BXX or larger). The 1255 attachment cannot operate concurrently with the Communications Adapter (#2500, #3500) which has been assigned as the low-priority line. Therefore only the Communications Adapter (#2500, #3500) with the high-priority address can be used while operating the 1255. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** One of the Integrated Modems, CCITT Interface, or DDSA for this adapter. See "Specify" for required modem cable and attachment codes.

Second Communications Adapter - BSC/SDLC (#3500): Required to attach a second communications line via appropriate interface or

modem. In conjunction with stored program control, this feature permits System/34 to function on a switched, nonswitched public or private communications line. The adapter provides both BSC and SDLC. The proper line protocol is loaded into the control processor at program execution time. The Communications Adapter features (#2500 and #3500) operate at speeds up to 9600 bps on a nonswitched point-to-point or multipoint common carrier facility or equivalent privately owned communication facility and up to 4800 bps on a switched point-to-point facility. However, the aggregate bit rate when both adapters (#2500 and #3500) are operating concurrently is 9600 bps. The Second Communications Adapter (#3500) may be physically attached to System/34 which also has the 1255 Attachment (#1100), but these two attachments (#1100 and #3500) cannot operate concurrently. **Limitations:** Cannot be installed with Multiline Communications Adapter (#4500). SDLC support by System Support Program (5726-SS1) requires at least 48K bytes of main storage (5340 mdl BXX or larger). The 1255 attachment cannot operate concurrently with the Communications Adapter (#2500, #3500) which has been assigned as the low-priority line. Therefore only the Communications Adapter (#2500, #3500) with the high-priority address can be used while operating the 1255. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500, one of the Integrated Modems, CCITT Interface, or DDSA for this adapter. See "Specify" for required modem cable and attachment codes.

CCITT Interface (#3701): Provides a cable and interface for attachment of an IBM modem or PTT Mandatory Service meeting CCITT V.24/V.28 characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Limitations:** Cannot be installed with 1200 bps Integrated Modem (#5500, #5501), or 2400 bps Integrated Modem (#5600, #5601, #5602, #5610). **Maximum speed is 9600 bps. Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500 and may require #5734. See "Processor Unit Expansion Feature Configurator". **Note:** This feature may also require Internal Clock (#4703) if the external modem does not provide its own clocking. See "Modem/Interface Feature Configurator". (Japan only+ **Specify:** #2946 when attaching a non-IBM modem. This satisfies the NTT's DTE self-test requirement. +)

CCITT Interface (#3702): Provides a cable and interface for attachment of an IBM modem or PTT Mandatory Service meeting CCITT V.24/V.28 characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Limitations:** Cannot be installed with 1200 bps Integrated Modem (#6500, #6501) or 2400 bps Integrated Modem (#6600, #6601, #6602, #6610) or DDSA (#5652). **Maximum speed is 9600 bps. Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3500 and may require #5734. See "Processor Unit Expansion Feature Configurator". **Note:** This feature may also require Internal Clock (#4703) if the external modem does not provide its own clocking. See "Modem/Interface Feature Configurator". **Specify:** (Japan only+ **#2946** when attaching a non-IBM modem. This satisfies the NTT's DTE self-test requirement. +)

IBM Data Encryption Device (#3845, #3846): A 3845 or 3846 Data Encryption Device may be attached between the System/34 communications adapter and the external modem. **Prerequisites:** #3701, #3702, or #531X. **Note:** Refer to M2700, 3845, and 3846 pages for information on 3845 or 3846 configuration and communication capability.

Multiline Communications Adapter - MLCA (#4500): Four communications lines can be attached to System/34 using the MLCA. The MLCA is a microprocessor that operates in parallel with the main storage processor and other microprocessors in the system. Each communications line provides either BSC or SDLC protocol. The proper line protocol is loaded into the control processor at program execution time. This feature permits, in conjunction with stored program control, System/34 to function on a switched, nonswitched public or private communications line. Each communications line operates independently up to 9600 bps concurrently with the other lines. One line may operate at high-speed (above 9600 bps) independent of the other lines. However, the aggregate rate of the remaining lines must not exceed 9600 bps and the aggregate rate of all four lines must not exceed 65,600 bps. For BSC multipoint tributary operation, an auto-monitoring function is provided that allows the line to be monitored without a main storage program being required. In this mode, a negative response is sent to all polls and selects received from the host. For BSC processing to become active in main storage the operator must activate BSC data management. An SDLC auto-response mode is implemented in MLCA for secondary SDLC. The MLCA will handle some redundant supervisory responses, thus eliminating the need to always utilize the SDLC task in main storage for nonproductive activity. The MLCA in a primary SDLC environment off-loads from the main

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storage processor, the majority of the work required for nonproductive polling. In either case, an SNA/SDLC task must be active in main storage. The Multiline Communications Adapter (#4500) may be installed in place of the First and Second Communications Adapters (#2500 and #3500) providing for up to four communications lines. The maximum aggregate bit rate when all four lines of the MLCA are operating concurrently is 65,600 bps. One line may operate at 19,200, 50,000, or 56,000 bps, but the remaining lines must not exceed a total aggregate bit rate of 9600 bps. **Limitations:** When installed will reduce the disk storage available to the user by 80,640 bytes. Cannot be installed with First or Second Communications Adapter (#2500 or #3500). SDLC support by System Support Program (5726-SS1) requires at least 48K bytes of main storage (5340 mdl BXX or larger). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** See "Specify" for mandatory attachment codes. A Line Base Adapter must be configured for each line. **Note:** The units position of features #53XX and #54XX corresponds to the line number position; e.g., #5301 refers to the Line Base Adapter for line 1.

Line Base Adapter (#5301, #5302, #5303, #5304): Required for attachment of communication lines to the MLCA. Each line is independent of the others and may be ordered in any sequence. However, it is recommended that lines be ordered and installed in sequence. **Limitations:** See "Multiline Communications Adapter Configurator" for possible combinations of features. **Maximum:** Four. **Field Installation:** Yes. **Prerequisites:** #4500 and an Integrated Modem, DDS Adapter, Wideband Adapter, Auto-Call Adapter, X.21 Adapter, or CCITT Interface.

CCITT Interface (#5311, #5312, #5313, #5314): Provides a cable and interface for attachment of an IBM modem or non-IBM modem meeting CCITT V.24/V.28 characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Limitations:** Cannot be installed with an Integrated Modem, Analog Wideband Adapter, Auto-Call Adapter, X.21 Adapter, or DDS Adapter on the same Line Base Adapter. Maximum speed is 9600 bps. See "Multiline Communications Adapter Configurator" for possible combinations of features. **Maximum:** One per Line Base Adapter (four total). **Field Installation:** Yes. **Prerequisites:** The Line Base Adapter corresponding to line using the CCITT Interface. This feature may also require Internal Clock (#5321) if the external modem does not provide its own 1200 bps clocking. **Specify:** Indicate by code and quantity the number of lines using the indicated service. (Japan only+ #2946 for Japan non-IBM modem attachment. +)

1200 bps Integrated Modem (#5331, #5332, #5333, #5334, #5341, #5342, #5343, #5344): A modem integrated into the system for SDLC or BSC data transmission at 1200 bps over nonswitched or switched facilities. Half-speed operation at 600 bps is indicated via system utility program. It is available in two different versions: #533X for non-switched and #534X for switched with auto-answer. Attachment to the nonswitched (2- or 4-wire) facilities is via an IBM-provided cable directly to the line, facility DA3. Attachment to the switched facilities is via an IBM-provided cable (Except Canada+ directly to the line. +) (Canada only+ to a common carrier arrangement type CBS or equivalent. +) **Limitations:** Cannot be installed with CCITT Interface, Analog Wideband Adapter, Auto-Call Adapter, another integrated modem, X.21 Adapter, or DDS Adapter on the same Line Base Adapter. #533X and #534X cannot be installed together on the same Line Base Adapter. See "Multiline Communications Adapter Configurator" for possible combinations of features. **Maximum:** One per Line Base Adapter (four total). **Field Installation:** Yes. **Prerequisites:** Line Base Adapter corresponding to the line using the 1200 bps Integrated Modem and #5321. **Note:** The device communicating with System/34 must also be equipped with a 1200 bps Integrated Modem using the same 2-wire or 4-wire mode of attachment to the line.

4800 bps Integrated Modem (#5351, #5352, #5353, #5354, #5361, #5362, #5363, #5364): A modem integrated into the system for SDLC or BSC data transmission at 4800 bps over nonswitched facilities or switched network. Half-speed operation at 2400 bps is possible via a systems utility program. Configuration options such as "local speed control" or "remote speed control" are performed by Customer Engineering at install time. For additional information on configuration options refer to M3864 pages. The 4800 bps modem is available in two different versions: #535X for nonswitched and #536X for switched with auto-answer. #536X conforms to the CCITT recommended V.27ter. Attachment to nonswitched (4-wire) facilities is via an IBM-provided cable directly to the line, facility DA6. Attachment to the switched network is (Except Canada+ via a WT Public Switched Network Adapter when allowed by local PTT regulations. (Canada only+ Attachment to the switched network is via IBM-provided cable to a common carrier arrangement type CBS. +) The 4800 bps Integrated

Modem is equivalent to and compatible with the 3864 Modem. The device communicating with the System/34 must also be equipped with a 3864 compatible integrated 4800 bps modem or a stand-alone 3864 using the same 2- or 4-wire mode of attachment to the line. For additional information on the 3864, refer to *IBM 3863, 3864, 3865 Introduction and Site Preparation Guide* (GA27-3200). **Limitations:** Cannot be installed with CCITT Interface, 1200 bps Integrated Modem, Analog Wideband Adapter, Auto-Call Adapter, X.21 Adapter, or DDS Adapter on the same Line Base Adapter. See "MLCA Feature Configurator" for possible combination of features. **Maximum:** One per Line Base Adapter; two per MLCA. **Field Installation:** Yes. **Prerequisites:** Line Base Adapter corresponding to the line using the 4800 bps Integrated Modem. (Japan only+ **Specify:** #2943 for attachment of #5351, #5352, #5353, or #5354 to NTT D-1 service. +)

X.21 Adapter (#5371, #5372, #5373, #5374): This feature provides an interface for attachment to either an X.21 switched or X.21 non-switched network. Both BSC and SDLC communications are supported. Refer to Facilities L3 to L6 (switched) or N3 to N6 (nonswitched) in the M2700 pages for the networks and data circuit-terminating equipment (DCE) that are supported. The network establishes the data rate and supplies the clock. The System/34 can communicate via the X.21 Adapter (#5371, #5372, #5373, #5374) with devices that do not have native X.21 Adapters. These devices must be attached to the network via an X.21bis DCE. This method of attachment uses the CCITT V.24/.28 interface. Refer to facilities K3 to K5 (switched) and M3 to M5 (nonswitched) in the M2700 pages for the list of devices that can be attached via an X.21bis DCE.

Switched Networks: Communications at 2400, 4800, 9600, and 48,000 bps are supported. Auto-call function is provided for switched lines. **Note:** When an X.21 line is configured as switched, microcode is loaded into the MLCA memory in space that would normally support a Line Base Adapter. Therefore, if one of the X.21 lines is configured as switched, the MLCA is limited to a maximum of three lines.

Nonswitched networks: Transmission may be at speeds of 2400, 4800, 9600 bps for multipoint operations. Some X.21 networks may not support multipoint operations. The installation of these features is dependent on the availability of an X.21 network that is compatible with IBM's implementation of an X.21 as described in the *IBM Implementation of X.21 Interface General Information Manual* (GA27-3287). The no-charge codes (#91XX) that specify the type of network attachment must be accurately entered with the order. **Limitations:** Cannot be installed with an integrated modem, CCITT Interface, DDS Adapter, or Analog Wideband Adapter on the same Line Base Adapter. **Note:** The X.21 Adapter cannot be configured to support switched lines on a System/34 that has an Auto-Call Adapter installed. When an X.21 Adapter is operating at 48,000 bps, the other lines cannot exceed an aggregate rate of 9600 bps. **Maximum:** One per Line Base Adapter, four total for nonswitched, three total for switched. **Field Installation:** Yes. **Prerequisites:** Line Base corresponding to the line using the X.21 Adapter. See "Multiline Communications Adapter Configurator" for possible combinations of features.

Digital Data Service (DDS) Adapter (#5391, #5392, #5393, #5394): An integrated adapter for BSC or SDLC data transmission at speeds of 2400, 4800, 9600, and 56,000 bps. The DDS Adapter may only be used to locally connect a System/34 to another supported device with a DDS Adapter. This connection requires a special accessory adapter cable and supports point-to-point connections only. No modem or channel service unit is required. See "DDS Adapter Connector" under "Accessories". **Limitations:** Cannot be installed with an Integrated Modem, Analog Wideband Adapter, Auto-Call Adapter, X.21 Adapter, or CCITT Interface on the same Line Base Adapter. When a DDS Adapter is operating at 56,000 bps, the other lines cannot exceed an aggregate rate of 9600 bps. See "Multiline Communications Adapter Configurator" for possible combinations of features. **Maximum:** One per Line Base Adapter (four total) **Field Installation:** Yes. **Prerequisites:** Line Base Adapter corresponding to the line using the DDS Adapter.

Analog Wideband Adapter (#5401, #5402, #5403, #5404): Provides a cable and interface for attachment of a WE 303 type modem or equivalent operating at 19,200 bps or 50,000 bps. The clocking is provided by the modem or modem eliminator. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. **Limitations:** Cannot be installed with an Integrated Modem, CCITT Interface, Auto-Call Adapter, X.21 Adapter, or DDS Adapter on the same Line Base Adapter. Other lines cannot exceed an aggregate speed of 9600 bps when operating in conjunction with the Analog Wideband Adapter. See "Multiline Communications Adapter Configurator" for possible combinations of features. (Except Canada+ This feature may only be used for high-speed local attachments where

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the attaching device does not support the 56,000 bps DDSA. +) **Maximum:** One per MLCA. **Field Installation:** Yes. **Prerequisites:** The Line Base Adapter corresponding to line using the Analog Wideband Adapter.

Auto-Call Adapter (#5411, #5412, #5413, #5414): Permits the System/34 when attached to a switched network facility via an appropriate external modem and Auto-Call unit, (meeting CCITT recommendation V.25) to initiate a data link connection to a remote device. The remote device must have auto-answer capability. Provides automatic dialing under program control. An Auto-Call Adapter (#541X) must always be installed in conjunction with an Interface (#531X) on another line, thus utilizing two line positions on the MLCA. Therefore, the use of auto-call will reduce the total number of lines available. **Limitations:** Cannot be installed with an CCITT Interface, Integrated Modem, Analog Wideband Adapter, X.21 Adapter, or DDS Adapter on the same Line Base Adapter as the Auto-Call feature. See "Multiline Communications Adapter Configurator" for possible combination of features. **Note:** The Auto-Call Adapter cannot be used on a System/34 that has X.21 switched lines. **Maximum:** One per Line Base Adapter, two per MLCA. **Field Installation:** Yes. **Prerequisites:** Line Base Adapter corresponding to the line using the Auto-Call Adapter.

1200 bps Integrated Modem (#5500, #5501): A modem for SDLC or BSC data transmission at 1200 bps over nonswitched facilities or switched network. Half-speed operation at 600 bps is indicated via a system utility program. Available in two different versions: #5500 for nonswitched or #5501 for switched with auto-answer. Attachment to the nonswitched (2- or 4-wire) facilities is via an IBM-provided cable directly to the line, facility DA3. Attachment to the switched network is via an IBM-provided cable (Except Canada+ directly to the line, facility CA2 +). (Canada only+ Attachment to the switched network is via an IBM cable to a common carrier arrangement type CBS. +) The device communicating with System/34 must also be equipped with a 1200 bps Integrated Modem. **Limitations:** Cannot be installed with Interface (#3701) or 2400 bps Integrated Modem (#5600, #5601, #5602, #5610), or DDSA (#5650, #5651). #5500 and #5501 cannot be installed together. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500, #4703, and may require #5734. See "Processor Unit Expansion Feature Configurator" and "Modem/Interface Feature Configurator". (Japan only+ Specify: #2943 for attachment of #5500 to NTT D-1 Service. +)

2400 bps Integrated Modem (#5600, #5601, #5602): A modem for SDLC or BSC data transmission at 2400 bps over nonswitched facilities, equivalent to and compatible with similarly featured 3872 Modems. Available in three different versions: #5600 for nonswitched, point-to-point, #5601 for nonswitched, multipoint control and #5602 for nonswitched, multipoint tributary. Attachment to nonswitched (2- or 4-wire) facilities is directly to the line, facility DA5 via an IBM-provided cable. The 2400 IM is equivalent to and compatible with the 3872 Modem. The device communicating with the System/34 must also be equipped with a 3872 compatible integrated 2400 bps modem or a stand-alone 3872 Modem. **Limitations:** Cannot be installed with Interface (#3701) or another Integrated Modem (#5500, #5501, #5610), #5600, #5601, and #5602, or #5610 cannot be installed together. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500, #5733 and/or #5735. See "Processor Unit Feature Expansion Configurator" and "Modem/Interface Feature Configurator". (Japan only+ Specify: #2943 for attachment of #5600, #5601 or #5602 to NTT D-1 Service. +)

(Canada only+)

2400 bps Integrated Modem (#5610): A modem for SDLC or BSC data transmission at 2400 bps over a switched network with automatic answer capability. This modem is equivalent to and compatible with similarly featured 3872 Modems. Half-speed operation at 1200 bps is indicated via a system utility program. Attachment to the switched network is via an IBM-provided cable to common carrier arrangement, type CBS or equivalent. The 2400 IM is equivalent to and compatible with the 3872 Modem. The device communicating with the System/34 must also be equipped with a 3872 compatible integrated 2400 bps modem or a stand-alone 3872 Modem. **Limitations:** Cannot be installed with Interface (#3701) or another Integrated Modem #5500, #5501, #5600, #5601, #5602, or DDSA (#5650, #5651). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500, #5733 and/or #5735. See "Modem/Interface Feature Configurator" and "Processor Unit Expansion Feature Configurator". +)

Digital Data Service (DDS) Adapter (#5650): An integrated adapter for BSC or SDLC data transmission at speeds of 2400, 4800, or 9600 bps. The DDS Adapter may only be used to locally connect a System/34 to another supported device with a DDS Adapter. This

connection requires a special accessory adapter cable connector and supports point-to-point connections only. No modem is required. See "DDS Adapter Connector" under "Cable Connector Accessories". **Limitations:** Cannot be installed with CCITT Interface (#3701), 1200 bps Integrated Modem (#5500, #5501) or 2400 bps Integrated Modem (#5600, #5601, #5602, #5610). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500.

Digital Data Service (DDS) Adapter (#5652): An integrated adapter for BSC or SDLC data transmission at speeds of 2400, 4800, or 9600 bps. The DDS Adapter may be used only to locally connect a System/34 to another supported device with a DDS Adapter. This connection requires a special accessory adapter cable connector and supports point-to-point connections only. No modem is required. See "DDS Adapter Connector" under "Accessories". **Limitations:** Cannot be installed with Interface (#3702), 1200 bps Integrated Modem (#6500, #6501) or 2400 bps Integrated Modem (#6600, #6601, #6602, #6610). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3500.

1200 bps Integrated Modem (#6500, #6501): A modem for SDLC or BSC data transmission at 1200 bps over nonswitched facilities or switched network. Half-speed operation at 600 bps is indicated via a system utility program. Available in two different versions: #6500 for nonswitched, #6501 for switched with auto-answer. Attachment to the nonswitched (2- or 4-wire) facilities is via an IBM-provided cable directly to the line, facility DA3. Attachment to the switched network is via an IBM-provided cable (Except Canada+ directly to the line, facility CA2 +). (Canada only+ to a common carrier arrangement type CBS or equivalent +). The device communicating with System/34 must also be equipped with a 1200 bps Integrated Modem. **Limitations:** Cannot be installed with Interface (#3702) or 2400 bps Integrated Modem (#6600, #6601, #6602, #6610), or DDSA (#5652). #6500 and #6501 cannot be installed together. **Maximum:** One. **Prerequisites:** #3500, #4703, and may require #5734. See "Modem/Interface Feature Configurator" and "Processor Unit Expansion Feature Configurator". (Japan only+ Specify: #2943 for attachment of 6500 to NTT D-1 service. +)

2400 bps Integrated Modem (#6600, #6601, #6602): A modem for SDLC or BSC data transmission at 2400 bps over nonswitched facilities, equivalent to and compatible with similarly featured 3872 Modems. Available in three different versions: #6600 for nonswitched, point-to-point, #6601 for nonswitched multipoint control, and #6602 for nonswitched multipoint tributary. Attachment to nonswitched (2- or 4-wire) facilities is directly to the line, facility DA5 via an IBM-provided cable. The 2400 IM is equivalent to and compatible with the 3872 Modem. The device communicating with the System/34 must also be equipped with a 3872 compatible integrated 2400 bps modem or a stand-alone 3872 Modem. **Limitations:** Cannot be installed with Interface (#3702) or another Integrated Modem (#6500, #6501, #6610), or DDSA (#5652). #6600, #6601, #6602, and #6610 cannot be installed together. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #6500, #5733 and/or #5735. See "Processor Unit Expansion Feature Configurator". (Japan only+ Specify: #2943 for attachment of #6600, #6601, or #6602 to NTT D-1 service. +)

(Canada only+)

2400 bps Integrated Modem (#6610): A modem for SDLC or BSC data transmission at 2400 bps over a switched network with automatic answer capability. This modem is equivalent to and compatible with similarly featured 3872 Modems. Half-speed operation at 1200 bps is indicated via a system utility program. Attachment to the switched network is via an IBM-provided cable to a common carrier arrangement type CBS. The 2400 IM is equivalent to and compatible with the 3872 Modem. The device communicating with the System/34 must also be equipped with a 3872 compatible integrated 2400 bps modem or a stand-alone 3872 Modem. **Limitations:** Cannot be installed with Interface (#3702) or another Integrated Modem (#6500, #6501, #6600, #6601, #6602). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3500, #5733 and/or #5735. See "Modem/Interface Feature Configurator" and "Processor Unit Expansion Feature Configurator".

Switched Network Backup (SNBU) (#7951): Provided for backup attachment of System/34 to the public switched network when the 2400 bps Integrated Modem (#5600, #5601, #5602) is used on a nonswitched line as the prime facility. It can communicate with a compatible 2400 bps Integrated Modem or a 3872 Modem when either is equipped with switched network capability. Selection of the primary or backup facility is via an operator invoked system utility program. Attachment to the switched network is made via a common carrier arrangement type CDT or equivalent. Calls must be established and answered manually. Operator intervention, program modification, or both may be required on the using system/terminal. Additional

**5340 System Unit (cont'd)**

customer program routines will be required, in existing BTAM programming, to fully utilize the capabilities of the Switched Network Backup feature. For additional information, see the *IBM 3872 Modem User's Guide* (GA27-3058). **Limitations:** Cannot be installed with Switched Network Backup with Auto-Answer (#7952). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500 and #5600, #5601, or #5602, and appropriate Processor Unit Expansion Features for 2400 bps Integrated Modem.

Switched Network Backup with Auto-Answer (SNBU/AA) (#7952): Same as Switched Network Backup (#7951) plus the added capability of automatically answering incoming calls when attached to a common carrier arrangement of the CBS type (or equivalent). Selection of the prime or backup facility is via an operator invoked system utility program. Operation intervention, program modification, or both may be required on the using system or terminal. Additional customer program routines will be required, in existing BTAM programming, to fully utilize the capabilities of Switched Network Backup. For additional information see the *IBM 3872 Modem User's Guide* (GA21-3058). **Limitations:** Cannot be installed with Switched Network Backup (#7951). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2500, #5600, #5601, or #5602, and appropriate Processor Unit Expansion Features for 2400 bps Integrated Modem.

Switched Network Backup (SNBU) (#7953): Provided for backup attachment of System/34 to the public switched network when the 2400 bps Integrated Modem (#6600, #6601, #6602) is used on a nonswitched line as the prime facility. It can communicate with a compatible 2400 bps Integrated Modem or a 3872 Modem when either is equipped with switched network capability. Selection of the primary or backup facility is via an operator invoked system utility program. Attachment to the switched network is made via a common carrier arrangement type CDT or equivalent. Calls must be established and answered manually. Operator intervention, program modification, or both may be required on the using system/terminal. Additional customer program routines will be required, in existing BTAM programming, to fully utilize the capabilities of the Switched Network Backup feature. For additional information, see the *IBM 3872 Modem User's Guide* (GA21-3058). **Limitations:** Cannot be installed with Switched Network Backup with Auto-Answer (#7954). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3500 and #6600, #6601, or #6602.

Switched Network Backup with Auto-Answer (SNBU/AA) (#7954): Same as Switched Network Backup (#7953) plus the added capability of automatically answering incoming calls when attached to a common carrier arrangement type CDT or equivalent. Selection of the prime or backup facility is via operator invoked system utility program. Operation intervention, program modification, or both may be required on the using system/terminal. Additional customer program routines will be required, in existing BTAM programming, to fully utilize the capabilities of the Switched Network Backup feature. For additional information see the *3872 Modem User's Guide* (GA21-3058). **Limitations:** Cannot be installed with Switched Network Backup (#7953). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #3500 and #6600, #6601, or #6602. +)

IBM Modems: One IBM Modem can be attached to each Communications Adapter. **Prerequisites:** Communications Adapter (#2500, #3500); Interface (#3701, #3702), Processor Unit Expansion (#5734) or Multiline Communications Adapter (#4500), Line Base Adapter (#5301, #5302, #5303, #5304), and Interface (#5311, #5312, #5313, #5314).

Modem	Speed (bps)	Facility
3863 mdl 1,2	2400	C3, D5
3868 mdl 1	2400	D5
3864 mdl 1,2	4800	C4, D6
3868 mdl 2	4800	D6
3865 mdl 1,2	9600	D8
3868 mdl 3,4	9600	D8
3872 mdl 1	2400/1200	C3, D5, K3
3976 mdl 3	1200/600	C2, D3

Note: For communications capabilities, product utilization, and special features, see M2700, 3863, 3864, 3865, and 3872 pages. To verify the proper integrated or external modem interface configuration to #2500 and #3500, refer to "Modem/Interface Feature Configurator" below. Select one of the categories and follow across for the required and optional special features. To verify the proper integrated or external modem interface configuration to #4500, refer to "Multiline Communications Adapter Configurator" below.

(Canada only+)
Modem/Interface Feature Configurator: (#2500 or #3500) only.

Modem/ Interface	Internal Clock (#4703)	Processor Unit Expansion (1)			SNBU, SNBU/AA (#7951, #7952, #7953, #7954)
		B (#5733)	C (#5734)	D (#5735)	
EIA Interface (#3701, #3702)	Optional	-	Required (2)	-	-
1200 bps Integrated Modem:					
Nonswitched (#5500, #5600)	Required	-	Required (2)	-	-
Switched with Auto- Answer (#5501, #5601)	Required	-	Required (2)	-	-
2400 bps Integrated Modem:					
Nonswitched Point- to-Point (#5800, #6600)	-	Required (3)	-	Required	Optional
Nonswitched Multipoint Tributary (#5802, #6602)	-	Required (3)	-	Required	Optional
Switched Network with Auto-Answer (#5610, #6610)	-	Required (3)	-	Required	-
Nonswitched Multipoint Control (#5801, #6601)	-	Required (3)	-	Required	Optional +)

(Except Canada+)
Modem/Interface Feature Configurator:
(#2500 or #3500) only.

Modem/ Interface	Internal Clock (#4703)	Processor Unit Expansion (1)		
		B (#5733)	C (#5734)	D (#5735)
CCITT Interface (#3701, #3702)	Optional	-	Required (2)	-
1200 bps Integrated Modem:				
Nonswitched (#5500, #5600)	Required	-	Required (2)	-
Switched with Auto- Answer (#5501, #5601)	Required	-	Required (2)	-
2400 bps Integrated Modem:				
Nonswitched Point- to-Point (#5800, #6600)	-	Required (3)	-	Required
Nonswitched Multipoint Tributary (#5802, #6602)	-	Required (3)	-	Required
Nonswitched Multipoint Control (#5801, #6601)	-	Required (3)	-	Required +)

Notes:

- (1) See "Processor Unit Expansion Feature Configurator".
- (2) Not required if Processor Unit Expansion B (#5733) and 2400 IM are installed. Not required on XX4, XX5, XX6, and XX7 mdls.
- (3) Not required on XX4, XX5, XX6, and XX7 mdls.

CCITT Interfaces (#3701, #3702, #5311, #5312, #5313, #5314): These interfaces permit operation with one of the following modems or PTT mandatory services. Consult IBM for further details.

MACHINES
5340 System Unit (cont'd)

Modem	Speed (bps)	Adapter/Facility Specify Codes For Communications: One selection must be specified from each of the following four categories for each Adapter/Line:			
Australia: Datel Switched Service Plan 32E Datel Nonswitched Service Plan 32E/F Datel Nonswitched Service Plan 34F	1200/600	Line	1	2	3
	1200/600		#2500	#3500	4
	4800/2400		or (#4500)	or (#4500)	(#4500)
Canada: The TCTS Dataroute Network - via the QS2A DCE	4800/2400	A Transfer Rate (bps):			
		600	#9001	#9401	#9501
		1200	#9002	#9402	#9502
		2000	#9003	#9403	#9503
		2400	#9004	#9404	#9504
		4800	#9005	#9405	#9505
		7200/3600	#9006	#9406	#9506
		9600	#9007	#9407	#9507
		High-Speed (above 9600)	#9008	#9408	#9508
		B Network Attachment:			
		Point-to-Point (nonswitched)	#9101	#9102	#9103
		Point-to-Point (switched)	#9111	#9112	#9113
		Multipoint			
		Tributary	#9121	#9122	#9123
		Multipoint			
		Control	#9131	#9132	#9133
		Local Attach via DDSA	#9141	#9142	#9143
			#9144		
		C Line Facility:			
		Duplex (4-wire)	#9311	#9411	#9511
		Half-Duplex (2-wire)	#9310	#9410	#9510
		D Primary Line Control:			
		BSC	#9201	#9202	#9203
		SDLC	#9211	#9212	#9213
					#9214

MACHINES
5340 System Unit (cont'd)
Multiline Communications Adapter (#4500) Configurator:

+-----+ Multiline Communications Adpt (MLCA) #4500 +-----+			
+-----+ AND +-----+			
+-----+ Specifies: System, use, Maximum of four speed, etc. by line lines per system +-----+			
+-----+			
+-----+ AND +-----+	+-----+ AND / OR +-----+	+-----+ AND / OR +-----+	+-----+ AND / OR +-----+
+-----+ Line Base Adapter 1 #5301 +-----+	+-----+ Line Base Adapter 2 #5302 +-----+	+-----+ Line Base Adapter 2 #5303 +-----+	+-----+ Line Base Adapter 4 #5304 +-----+
+-----+ AND +-----+	+-----+ AND +-----+	+-----+ AND +-----+	+-----+ AND +-----+
+-----+ Interface & modem #5311 +-----+	+-----+ Interface & modem #5312 +-----+	+-----+ Interface & modem #5313 +-----+	+-----+ Interface & modem #5314 +-----+
+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+
+-----+ Internal Clock #5321 (1) +-----+	+-----+ Internal Clock #5321 (1) +-----+	+-----+ Internal Clock #5321 (1) +-----+	+-----+ Internal Clock #5321 (1) +-----+
+-----+ 1200 bps Integrated REQ Modem #5331/5341 +-----+	+-----+ 1200 bps Integrated REQ Modem #5332/5342 +-----+	+-----+ 1200 bps Integrated REQ Modem #5333/5343 +-----+	+-----+ 1200 bps Integrated REQ Modem #5334/5344 +-----+
+-----+ Internal Clock #5321 (1) +-----+	+-----+ Internal Clock #5321 (1) +-----+	+-----+ Internal Clock #5321 (1) +-----+	+-----+ Internal Clock #5321 (1) +-----+
+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+
+-----+ DDS Adapter -OPT # 5391 +-----+	+-----+ DDS Adapter -OPT # 5392 +-----+	+-----+ DDS Adapter -OPT # 5393 +-----+	+-----+ DDS Adapter -OPT # 5394 +-----+
+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+
+-----+ DDS Adapter Connector #4236967 +-----+	+-----+ DDS Adapter Connector #4236967 +-----+	+-----+ DDS Adapter Connector #4236967 +-----+	+-----+ DDS Adapter Connector #4236967 +-----+
+-----+ X.21 Adapter #5371 (2) +-----+	+-----+ X.21 Adapter #5372 (2) +-----+	+-----+ X.21 Adapter #5373 (2) +-----+	+-----+ X.21 Adapter #5374 (2) +-----+
+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+
+-----+ Analog Wideband Adapter #5401 (3) +-----+	+-----+ Analog Wideband Adapter #5402 (3) +-----+	+-----+ Analog Wideband Adapter #5403 (3) +-----+	+-----+ Analog Wideband Adapter #5404 (3) +-----+
+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+
+-----+ 4800 bps Integrated Modem (4) #5351/5361 +-----+	+-----+ 4800 bps Integrated Modem (4) #5352/5362 +-----+	+-----+ 4800 bps Integrated Modem (4) #5353/5363 +-----+	+-----+ 4800 bps Integrated Modem (4) #5354/5364 +-----+
+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+	+-----+ OR +-----+
+-----+ Auto-Call Adapter #5411 (5) +-----+	+-----+ Auto-Call Adapter #5412 (5) +-----+	+-----+ Auto-Call Adapter #5413 (5) +-----+	+-----+ Auto-Call Adapter #5414 (5) +-----+

Notes:

- (1) Total of one per system; one will handle any or all lines.
(2) X.21 switched restricts the MLCA to three lines and prevents the use of the Auto-Call Adapter on any MLCA line.

- (3) Only one per system.
(4) Only two per system.
(5) Only two per System. Not allowed if X.21 switched is configured on any MLCA line.

5340 System Unit (cont'd)

System Utility Support: A system utility program is used for the selection of certain data communications characteristics such as: full-speed or half-speed, internal or external modem clocking, line type, station address, etc. See the *System/34 System Support Reference Manual* (SC21-5155) for a complete description of \$SETCF utility.

References: See the appropriate host system programming pages for possible restrictions.

See M2700 pages for additional information concerning modems, communications facilities, machine attachment requirements, terminal intermix, operating capabilities, and customer responsibilities.

Refer to *System/34 Installation Manual - Physical Planning* (GA21-9242) for physical installation requirements.

Replaced Parts: Replaced parts from any special feature installation or removal remain the property of the customer.

MODEL CONVERSIONS

All conversions may be field installed.

Any model upgrade that involves a disk storage capacity change may require replacement of the disk storage mechanism. Adequate provision must be made for retaining the data contained on the replaced disk mechanism and elimination of user proprietary information.

The upgrade purchase prices for model conversions may be greater than the purchase price differentials. The customer should carefully evaluate his future requirements when purchasing a system.

Replaced parts from any model conversion that includes a disk storage capacity change become the property of IBM.

Replaced parts from any model conversion which changes the diskette remain the property of the customer.

ACCESSORIES

Keys: The 5340 with Keylock (#4655) is shipped with two keys. Additional keys may be purchased from IBM. (Vendor will supply additional keys only to the original purchaser). Order , specifying P/N 2546418. A letter of authorization with key identification number must accompany each order. Allow six to eight weeks for delivery.

DDS Adapter Connector: A specially designed connector allows the cables from a System/34 DDS Adapter to be connected to another supported device with a DDS Adapter. This provides for the local connection of two devices without the use of any modems or channel service units. This is a purchase only item. Order , specifying P/N 4236967. Allow six to eight weeks for delivery. **Maximum:** One per Digital Data Service (DDS) Adapter (four per system total). **Field Installation:** Yes.

Cables: Required, see "Specify".

SUPPLIES

For Diskettes and Diskette Magazines see IBM.

5360 SYSTEM UNIT

PURPOSE

Contains main storage, disk storage, diskette drive, communications features, logical processing circuits and control for I/O units on S/36.

758Mb	760.06Mb	758.39Mb
1,115Mb	1,119.72Mb	1,118.05Mb
716Mb	719.32Mb	717.65Mb
1,074Mb	1,078.98Mb	1,077.31Mb
1,432Mb	1,438.64Mb	1,436.97Mb

MODELS

Model	Main Storage (1)	Diskette Drive	Disk Storage (2)
A11*	128K	Single	30Mb
A21*	128K	Magazine	30Mb
A12*	128K	Single	60Mb
A22*	128K	Magazine	60Mb
B13	256K	Single	200Mb
B23	256K	Magazine	200Mb
B14	256K	Single	400Mb
B24	256K	Magazine	400Mb
B15 (3,5)*	256K	Single	600Mb
B25 (3,5)*	256K	Magazine	600Mb
B16 (3,5)*	256K	Single	800Mb
B26 (3,5)*	256K	Magazine	800Mb
B1A (3,5)	256K	Single	758Mb
B2A (3,5)	256K	Magazine	758Mb
B1B (3,5)	256K	Single	1,116Mb
B2B (3,5)	256K	Magazine	1,116Mb
C2K (4)*	512K	Magazine	716Mb
C2L (4,5)*	512K	Magazine	1,074Mb
C2M (4,5)*	512K	Magazine	1,432Mb
D13 (3)	1Mb	Single	200Mb
D23 (3)	1Mb	Magazine	200Mb
D14 (3)	1Mb	Single	400Mb
D24 (4)	1Mb	Magazine	400Mb
D15 (3,5)	1Mb	Single	600Mb
D25 (3,5)	1Mb	Magazine	600Mb
D16 (3,5)	1Mb	Single	800Mb
D26 (3,5)	1Mb	Magazine	800Mb
D1A (3,5)	1Mb	Single	758Mb
D2A (3,5)	1Mb	Magazine	758Mb
D1B (3,5)	1Mb	Single	1,116Mb
D2B (3,5)	1Mb	Magazine	1,116Mb
D2K (4)	1Mb	Magazine	716Mb
D2L (4,5)	1Mb	Magazine	1,074Mb
D2M (4,5)	1Mb	Magazine	1,432Mb

* No longer available.

Notes:

- Additional main storage (up to a maximum of 256K on AXX models and 1,792K on BXX models and 2,048K on CXX models and 7,168K on DXX models) is available as features.
- The actual capacity of the first disk on each system is reduced by 1.67Mb. This area is required for microcode, service aids, error logs, and diagnostics, and is not available to the user.
- Field install only.
- Supports 36 local workstations as standard. Single diskette drive models are not available.
- Requires larger frame (70 inches wide rather than 44 inches).

Disk Storage	Actual Capacity	User Capacity
30Mb	30.84Mb	29.17Mb
60Mb	61.69Mb	60.02Mb
200Mb	200.20Mb	198.53Mb
400Mb	400.40Mb	398.73Mb
600Mb	600.60Mb	598.93Mb
800Mb	800.80Mb	799.13Mb

Minimum System Configuration: A 5360 System Unit, a system console display, and a printer. A system printer must be identified to satisfy IBM maintenance requirements when using the System Support Program (5727-SS1).

Customer Setup: The 5360 is designated Customer Setup (CSU) and offers customers ease-of-setup and relocation flexibility. The Customer Setup Allowance is one day. For additional information on CSU, refer to the GI section. One copy of "Setting Up Your Computer", SA21-9430, is included with each 5360.

HIGHLIGHTS

- Multiple workstation system with multiprogramming capability provided by the System Support Licensed Program (5727-SS1).
- Extension of S/34 capabilities.
- Local and remote workstation devices (up to 72 Local, 64 Remote):

Workstation Controller: (remote only)

- ▲ 5294-001
- ▲ 5251-012

Printers:

- ▲ 3812 with #3015
- ▲ 4224-101, 102, 1E2, 1C2
- ▲ 4234-002
- ▲ 4245-T12, T20
- ▲ 5219-D01, D02
- ▲ 5224-001, 002
- ▲ (Japan only > 5224-012 (55 lpm Ideographic, 200 lpm Alphameric) <)
- ▲ 5225-001, 002, 003, 004
- ▲ (Japan only > 5225-011 (85 lpm Ideographic, 300 lpm Alphameric) <)
- ▲ 5225-012 (140 lpm Ideographic, 475 lpm Alphameric) <)
- ▲ 5256-001, 002, 003
- ▲ 5262-001
- ▲ (Japan only > 5553-B01 (attached through a 5551 System Unit Model BXX) <)
- ▲ 5557-B01 (attached through a 5551 System Unit Model BXX)
- ▲ 5583-200 <)

Displays:

- ▲ 3179-002
- ▲ (Canada only > 3179-220 (supported in Release 4 via PRPQ P84113 or 5727-SS1 Office Enhancement #6240) <)
- ▲ 3180-002
- ▲ 3196-A1X, B1X
- ▲ (LAD only > 3196-A2X, B2X <)
- ▲ 3196-A20, B20 (A20 and B20 supported in Release 4 via PRPQ P84112 or 5727-SS1 Office Enhancement #6240)
- ▲ 3197-C, D
- ▲ 5251-011 or 999
- ▲ 5251-012 (remote only)
- ▲ 5291-001, 002
- ▲ 5292-001
- ▲ 5292-002

5415 Processing Unit (cont'd)

Modem (#5803, #5804). **Maximum:** One per Line Base. **Prerequisites:** #4891 for #3603, #4892 for #3604. One of four transfer rates: 2400 bps, 4800 bps, 7200 bps, or 9600 bps must be specified on the applicable Line Base.

EIA/CCITT Interface (#3703, #3704): Provides an interface and cable for attachment of an external modem meeting CCITT V.24/V.28 characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy.

Modems: The CCITT Interface (#3703, #3704) permits operation with one of the following IBM modems or PTT Mandatory Services:

Modem	Data Rate (bps)
3976 mdl 3	600 or 1200
3863 mdl 1 or 2	2400
3868 mdl 1	2400
3872	2400
3864 mdl 1 or 2	4800
3868 mdl 2	4800
3865 mdl 1 or 2	9600

PTT Mandatory Services: PTT mandatory modems would supply their own clock and comply with CCITT Recommendations V.24 and V.28, ISO Standard 2110 and other relevant CCITT recommendations as delineated in the M2700 pages. Other non-IBM modems may be attached subject to the provisions of the Multiple Supplier Systems Policy.

Limitations: Cannot be installed on the same Line Base with the 1200 bps Integrated Modem (#5803, #5804) or EIA/CCITT Local (#3603, #3604). **Maximum:** One per Line Base. **Field Installation:** Yes. **Prerequisites:** #4891 for #3703 or #4892 for #3704. See "Cables" under "Accessories".

Multi-Function Card Unit Attachment 250/60/60 cpm (#4100): To attach a 5424 Multi-Function Card Unit mdl A1. **Limitations:** Cannot be installed with #1601, #4130, or #8100. **Maximum:** One. **Field Installation:** Yes.

Multi-Function Card Unit Attachment 500/120/120 cpm (#4101): To attach a 5424 Multi-Function Card Unit mdl A2. **Limitations:** Cannot be installed with #1601, #4130, or #8100. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #4100.

1442 Mdl 6/7 Card Read Punch Attachment (#4130): To attach a 1442 mdl 6 or 7. **Limitations:** Cannot be installed with #1601, #4100, #4101, or #8100. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** A 5422 with 5415 mdls A17 through A20. #3950 on the 1442. #5502 must be ordered with mdl B, C, or D.

1403 Mdl 5 Printer Attachment 465 lpm (#4135): To attach a 1403 Printer mdl 5. **Limitations:** Cannot be installed with #4140 or #4150. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #4160 and a 5421 with #9185.

1403 Mdl 2 Printer Attachment 600 lpm (#4140): To attach a 1403 Printer mdl 2. **Limitations:** Cannot be installed with #4135 or #4140. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #4160 and a 5421.

1403 Mdl N1 Printer Attachment 1100 lpm (#4150): To attach a 1403 Printer mdl N1. **Limitations:** Cannot be installed with #4135 or #4140. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #4160 and a 5421.

1403 Basic Attachment Control (#4160): To attach all mdls of a 1403 Printer. **Maximum:** One. **Field Installation:** Yes.

Display Adapter (#4601): For direct local attachment of 3270 devices (3277 mdls 1, 2, 3284 mdls 1, 2, 3286 mdls 1, 2, 3287 mdls 1, 2, 3288 mdl 2) in any combination. Includes the basic control and interface for three devices. The 3270 device cables, maximum length 600m (2,000 feet) plug directly into the 5415 when this feature is installed. For attachment of additional 3270 devices (maximum of 30), see Device Interface (#4602). Programming support for the attached devices is provided by the Multi-line/Multipoint interface and the Communication Control Program feature of the SCP. **Limitations:** Cannot be installed with BSCA-2 (#2084). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #5733. See "Processing Unit Expansion Features Configurator" for possible requirements for additional expansion features. See applicable machines pages for 3270 device ordering details.

Device Interface (#4602): Provides for attachment of three additional 3270 devices (3277 mdls 1, 2, 3284 mdls 1, 2, 3286 mdls 1, 2, 3287 mdls 1, 2, 3288 mdl 2) in any combination to the Display Adapter

(#4601). **Maximum:** Nine, for a maximum of 30 attached devices. **Field Installation:** Yes. **Prerequisites:** #4601.

Internal Clock (#4703, #4723): Generates synchronizing and timing signals for BSCA operation when they are not provided by the attached modem. When this feature is installed on System/3 mdl 15, all other BSC stations attached to the same data link must also be equipped with a similar Internal Clock feature. See IBM, for determination of requirements with planned modems. #4703 for #2074 and #4723 for #2084. Will service rates 600 bps, 1200 bps, 2000 bps, or 2400 bps. **Maximum:** One per BSCA. **Field Installation:** Yes. **Prerequisites:** #2074 or #2084, and one of the rate options listed above, see "Transfer Rate".

Internal Clock (#4733, #4734): Provides business machine clocking at 1200 bps for the external or integrated modem operating at that line speed. This feature is always required for the 1200 bps Integrated Modem (#5803, #5804). **Limitations:** 1200 bps only. For use only when modem does not provide clocking. **Maximum:** One per Line Base. **Field Installation:** Yes. **Prerequisites:** #4891 for #4733, #4892 for #4734.

Local Communications Adapter (#4765): Permits local attachment of one binary synchronous IBM control unit or terminal with CCITT V.24/V.28 type interface to a System/3 mdl 15. The external modem cable of the device will attach directly to the 5415 when this feature is installed. Data transfer rate is 2400 bps only. EBCDIC transmission code must be specified when applicable on the attached device. See the System/3 programming pages for devices supported by IBM programming. **Limitations:** Cannot be installed with BSCA-1 (#2074). Data exchange with attached device is non-transparent only. For data-transparent operation contact IBM. **Maximum:** One per 5415. **Field Installation:** Yes. **Prerequisites:** Requires the same Processing Unit Expansion Features as BSCA-1 (#2074). See "Processing Unit Expansion Features Configurator" for possible requirements for additional expansion features. See appropriate machines pages for attached device prerequisites. **Specify:** See "BSCA-1 and BSCA-2 Optional Specify Codes" above for applicable device attachment codes.

1200 bps Integrated Modem (#4781): A modem for BSC data transmission at 1200 bps over nonswitched facilities. Attachment to nonswitched (2- or 4-wire) facilities is via an IBM-provided cable directly to the line, Facility DA3. The device communicating with System/3 mdl 15 must also be equipped with a 1200 bps Integrated Modem or line adapter or a 3976 mdl 3 modem. **Limitations:** Cannot be installed with sub-feature EIA/CCITT Local Attachment (#3601, #3602). **Maximum:** One per BSCA. **Field Installation:** Yes. **Prerequisites:** #2074, #5201, #4703 and #9751, or #2084, #5202, #4723 and #9851.

Line Base, 1st (#4891): For attachment of the first communications line to the BSCC (#2094) through one of the line interface features. One of the line interface features #3603, #3604, #3703, #3704, #5803, #5804, must be ordered for each Line Base depending on the type of communication facility and modem to be used. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2094. **Specify:** See "BSCC Optional Specify Codes" above for selection of transmission codes, line speeds, etc.

Line Base, 2nd (#4892): For attachment of the second communications line to the BSCC (#2094) through one of the line interface features. One of the line interface features #3603, #3604, #3703, #3704, #5803, #5804, must be ordered for each Line Base depending on the type of communication facility and modem to be used. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #2094 and #4891. **Specify:** See "BSCC Optional Specify Codes" above for selection of transmission codes, line speeds, etc.

Modem Base (#5201, #5202): Provides for mounting of one 1200 bps Integrated Modem (#4781). #5201 for #2074 and #5202 for #2084. **Maximum:** One per BSCA. **Field Installation:** Yes. **Prerequisites:** #2074 for #5201 or #2084 for #5202.

Power Supply Expansion A (#5501): Provides additional processing unit 6 volt power. Required when certain RPQs are attached. Contact IBM for details. **Maximum:** One. **Field Installation:** Yes.

Power Supply Expansion B (#5502): Provides additional processing unit 24 V power. Required on mdls B, C, and D when 5424 is not attached, or if Channel Terminator Feature #1601 is installed. **Maximum:** One. **Field Installation:** Yes.

Processing Unit Expansion 1 (#5733): Provides additional processing unit power supply and connections. Refer to the "Processing Unit Expansion Features Configurator" below to determine requirements.

5415 Processing Unit (cont'd)

May be required when certain RPQs are ordered. Contact IBM for details. **Maximum:** One. **Field Installation:** Yes.

Processing Unit Expansion 2 (#5734): Provides additional processing unit power supply and connections. May be required when certain RPQs are ordered. Contact IBM for details. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #5733.

Processing Unit Expansion 3 (#5735): Provides additional processing unit power supply and connections. May be required when certain RPQs are ordered. Contact IBM for details. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #5733 and #5734.

Processing Unit Expansion Features Configurator: [All mdl's except D with BSCC]

I/O Unit Attachment	Communications					
	None	#2074 or #4765	#2084 & #2074 or #4765	#7081 & #2074 or #4765	#2084 & #7081 or #4765	#4601 & #7081 or #2074 or #4765
Neither						
2501 (#8090) nor						
3411 (#7951) nor	----	----	#5733	#5733	#5733	----
3741 (#8220)						
2501 (#8090)	----	#5733	#5733	#5733	#5733	----
2501 & 3411						
(#8090 & #7951)	----	#5733	#5733	#5733	#5733	#5733
2501 & 3411						
& 3741 (#8090	#5733	#5733	#5733	#5733	#5733	#5734
& #7951 & #8220)						
3411 (#7951)	----	#5733	#5733	#5733	#5733	----
3411 & 3741						
(#7951 & #8220)	----	#5733	#5733	#5733	#5733	#5733
3741 (#8220)	----	#5733	#5733	#5733	#5733	#5733
3741 & 2501						
(#8220 & #8090)	----	#5733	#5733	#5733	#5733	#5733

Processing Unit Expansion Features Configurator: [Mdl D with BSCC]

I/O Unit Attachment	Communications					
	#2094 or #4765	#2094 & #2074 or #4765	#2094 & #2084 & #2074 or #4765	#2094 & #7081 & #2074 or #4765	#2094 & #2084 & #7081 or #4765	#4601 & #2074 or #4765
Neither						
2501 (#8090) nor						
3411 (#7951) nor	----	#5733	#5733	#5733	#5733	#5733
3741 (#8220)						
2501 (#8090)	#5733	#5733	#5733	#5733	#5733	#5734
2501 & 3411						
(#8090 & #7951)	#5733	#5733	#5733	#5733	#5734	#5733
2501 & 3411						
& 3741 (#8090	#5733	#5733	#5734	#5733	#5734	#5735
& #7951 & #8220)						
3411 (#7951)	#5733	#5733	#5733	#5733	#5733	#5733
3411 & 3741						
(#7951 & #8220)	#5733	#5733	#5733	#5733	#5734	#5735
3741 (#8220)	#5733	#5733	#5733	#5733	#5733	#5735
3741 & 2501						
(#8220 & #8090)	#5733	#5733	#5733	#5733	#5734	#5735

Note: If RPQs are on the 5415, contact Special Equipment Engineering Department. IBM.

1200 bps Integrated Modem (#5803, #5804): A modem for data transmission at 1200 bps over nonswitched (2- or 4-wire) facilities. Attachment to the communication facility is via an IBM-provided cable directly to the line (Facility DA3). All devices communicating with System/3 must be equipped with a compatible IBM 1200 bps Integrated Modem/Line Adapter, or a 3976 mdl 3 modem. **Maximum:** One per Line Base. **Field Installation:** Yes. **Limitations:** Cannot be

installed on the same Line Base with the EIA/CCITT Interface (#3703, #3704) or EIA/CCITT Local (#3603, #3604). Nonswitched facilities only. **Prerequisites:** #4733 for #5803 or #4734 for #5804. #4891 for #5803 or #4892 for #5804. See "Cables" under "Accessories". (Japan only) **Specify:** #2943 for attachment to NTT D1 service. +)

Serial I/O Channel (#7081): To attach a 1255 Magnetic Character Reader or a 3881 Optical Mark Reader. **Maximum:** One. **Field Installation:** Yes.

Station Selection (#7477, #7487): Permits the System/3 mdl 15 to operate as a compatible member of the IBM family of BSC terminals on a multipoint communications line as a tributary station. #7477 is for #2074 and #7487 is for #2084. Will service rates of 600 - 9600 bps. **Limitations:** Cannot be installed with Network Attachment (#9481, #9483, #9581, or #9583), Line Facility Attachment (#9391 or #9381), or Rate Selection Switch (#2834). **Maximum:** One per BSCA. **Field Installation:** Yes. **Prerequisites:** #2074 or #2084, #9392 or #9382, #9482 or #9582, and one of the rate selections, 600 to 7200 bps. **Note:** Control station operation on a System/3 mdl 15 BSCA with Station Selection installed is possible, but such operation cannot be performed concurrently with tributary station operation on that adapter. Additionally, a change in modems or in modem operation may be required to utilize the same adapter (at different periods of time) as a tributary station and as a control station adapter. #9484 or #9584 must be specified when control station operation is to be performed whether or not Station Selection (#7477, #7487) is installed.

Text Transparency (#7850, #7851): Permits the System/3 mdl 15 to transmit or receive 8-bit binary data and EBCDIC coded data. #7850 for #2074 and #7851 for #2084. **Limitations:** Cannot be installed with ASCII Transmission Code (#9061, #9071). **Limitations** on the use of this facility are described in SRL (GA27-3004). **Maximum:** One per BSCA. **Field Installation:** Yes. **Prerequisites:** #2074 or #2084, and #9060 or #9070.

3284 Attachment (#7901): To attach a 3284 Printer mdl 1. **Maximum:** One. **Field Installation:** Yes.

3411 Magnetic Tape Attachment (#7951): To attach a 3411 Magnetic Tape Unit and Control. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #5733, #5734, or #5735 may be required dependent upon other features. Refer to "Processing Unit Expansion Features Configurator" to determine requirements.

2501 Attachment (#8090): To attach a 2501 Card Reader mdl A1 or A2. **Limitations:** 2501 and 5424, 2560, 1442, or Channel Terminator Feature #1601. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** #5733, #5734, or #5735 may be required dependent upon other features. #3630 on the 2501. Refer to "Processing Unit Expansion Features Configurator" to determine requirements.

2560 Multi-Function Card Machine Attachment (#8100): To attach a 2560 Multi-Function Card Machine. **Limitations:** Cannot be installed with #1601, #4100, #4101, or #4130. **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** 5422 with 5415 mdl's A17 through A20. #5502 must be ordered with mdl B, C, or D. **Specify:** #9801 if 2560 mdl A1 is to be attached.

3741 Attachment (#8220): To directly attach a 3741 mdl 1, 2, 3, or 4. **Limitations:** For 3741 mdl's 3 and 4, System/3 does not support the Application Control Language (ACL). **Maximum:** One. **Field Installation:** Yes. **Prerequisites:** See "Processing Unit Expansion Features Configurator" for possible requirements for additional expansion features. #3265 or #3266 on 3741. #1601 on Cardless mdl B, C, or D.

TERMS and CONDITIONS

Plan Offering: Plan A
Purchase Option: 50 %
Machine Group: D
Warranty: B

Per Call: 2
Metering: Base Unit
Educational Allowance: No

MODEL CONVERSIONS

All model conversions are field installable. For a 5410 or 5415 mdl A to 5415 mdl B, C, or D conversion where an installed 5424 is to be moved to the new system, an MES must be submitted to remove the 5444(s) from the 5424. This MES must also delete #9400, and if a second 5444 is installed, #9401 or #9402 (all from the 5424). Replaced parts from any model conversion become the property of IBM.

MACHINES

5415 Processing Unit (cont'd)

ACCESSORIES

Cables: BSCA (#2074, #2084) and BSCC (#2094) require an appropriate cable order unless EIA/CCITT Local Attachment (#3601, #3602) is ordered, see *Installation Manual - Physical Planning* (GA21-9084).

SUPPLIES (None)

5525 SYSTEM UNIT

Models 20, 30, 40, 50 (NO LONGER AVAILABLE)

PURPOSE

The 5520 Administrative System is a shared logic system designed to support text processing, file processing, and electronic document distribution services for a wide variety of organizations. Text-oriented hardware and a licensed program have been combined to provide facilities for document (including file) creation, revision, storage, retrieval, and printing as well as optional local and/or remote document distribution.

MODELS

Model 20 020
Model 21 021
Model 30 030
Model 31 031
Model 32 032
Model 40 040
Model 50 050
Model 51 051

Configuration Overview (Mdl's 20, 30, 40, and 50)

	20	30	40	50	Notes
Use Prog 5611-SS1					1
# Display Station Lines	1-4	1-4	1-8	1-8	
# Display Sta Attachable	1-6	1-12	1-18	1-18	2,3
Disk Stor Capacity (MB)	29	29	65	130	4
Online Disks	1	1	1	23	5
# Printer/Comm Lines	0-2	0-4	0-8	0-16	6,7,8
# Printers Attachable *	0-3	0-6	0-10	0-12	6,7,8,9
# Mag Card Units	0-1	0-1	0-1	0-1	10

* May include a single (in exceptional cases more than one) 6670.

Notes:

- Licensed Program 5611-SS1 supports mdl's 20, 30, 40, and 50. See 5520 programming pages for details.
- One 5253 Display Station, to be designated as the primary display station, must be located within 6.1m (20 feet) of the System Unit and in the same room.

Not more than seven 5253 display stations (Canada only) or 5150 Personal Computers (<) per line. 5254 Dual Display Stations count as two each. May be multidropped up to 1,524 cable-meters (5,000 cable-feet) from the System Unit. (Canada only) > A 5150 should not be used as the 5520 primary or alternate display station. (<) The customer service representative must use the 5253 as the master display station to perform diagnostics. See also the "Special Note" following.

- When attached to the 5525 System Unit under control of licensed program 5611-SS1, the following characteristics apply to the (Canada only) > 5150 emulating a (<) 5253 or 5254:

- Maximum line length is 172 characters
- Maximum page length is 125 lines
- Overall page character count maximum of approximately 7,000 characters

Double underscore is obtainable under keyboard emulation. Blinking, reverse image, and non-display are under control of the program and not directly available to the operator.

- Disk storage is used to hold the licensed program, a library of documents available for text processing functions, and transient storage of documents in process of distribution. The total document capacity will be influenced by a number of factors. See "Special Note" following.
- The diskette drive supports Diskette 2D. Each customer-supplied diskette (2D) holds approximately one million bytes of information. However, since the diskettes are removable, the total offline storage is limited only by the number of diskettes available.
- Each line must be designated as one of these types:

- Local Device Control (LDC) (for attachment of 5219, 5257, 5258, 6670, and/or another 5525), no more than eight LDC lines per 5525.
- Attachment to switched communication lines.
- Attachment to nonswitched communication lines.

Note: A dedicated nonswitched SDLC communications line may also be used to attach a 6670 Information Distributor as a remote printer.

See 5520 programming pages for details of devices supported for remote attachment via communication lines.

- For multi-line configuration, the lines are controlled by a distribution controller (except on mdl 50, which requires a second controller for optional lines 9 to 16).
- The distribution controllers operate at specific numbers of bits per second and with specific number of receive buffers per line. The aggregate concurrent bps and concurrent buffer allocation requirements of devices attached to each controller should not exceed its specific capacities; see the "Special Note" below.
- Printers may be multidropped up to 1,524 cable-meters (5,000 cable-feet) radially from the System Unit on an LDC line. Maximum eight on one line (5525 mdl-dependent). 5219, 5257, 5258, 6670 may be mixed on a single line. A 5525 System Unit may be substituted for a printer on any LDC line where the printer attaches via feature #1702 or #1704. In such a configuration the primary system unit controls the printers. See also the "Special Note" following.
- The Mag Card Unit may be up to 4.6 meters (15 feet) from the System Unit. It is supported by Release 2 or 3 of Licensed Program 5611-SS1.

Configuration Overview (Mdl's 21, 31, 32, and 51):

	21	31	32	51	Notes
Use Prog 5611-SS2					1
# Display Station Lines	1-4	1-4	1-4	1-8	
# Display Sta Attachable	1-8	1-12	1-15	1-56	2,3,12
Disk Stor Capacity (MB)	29	29	58	130	4
Online Disk	1	1	1	23	5
# Printer/Comm Lines	0-2	0-4	0-8	0-16	6,7,8,11

# Printers Attachable *	0-3	0-6	0-8	0-12	6,7, 8,9
# Mag Card Units	0-1	0-1	0-1	0-1	10

* May include a single (in exceptional cases more than one) 6670.

Notes:

- Licensed Program 5611-SS2 supports mdl's 21, 31, 32, and 51 with the functions of text processing and system management functions, electronic document distribution, and files processing and stored procedures. Also, document distribution support to a host S/370 (BSC), 3270 emulation and printer support for a 6670 Information Distributor (SDLC). See 5520 programming pages for details.
- One 5253 Display Station, to be designated as the primary display station, must be located within 6.1m (20 feet) of the System Unit and in the same room.

Not more than seven 5253 Display Stations (Canada only >, 5150 or 5160 Personal Computers <) per line. 5254 Dual Display Stations count as two each. May be multidropped up to 1,524 cable-meters (5,000 cable-feet) from the System Unit.
- (Canada only > A 5150 or 5160 should not be used as the 5520 primary or alternate display station. <) See also the "Special Note" following.
- When attached to the 5525 System Unit under control of Licensed Program 5611-SS2, the following characteristics apply to the (Canada only > 5150 or 5160 emulating a <) 5253 or 5254:

Maximum line length 255 characters
Maximum page length 125 lines
Overall page character count maximum of approximately 8,000 characters

Double underscore is obtainable under keyboard emulation. Blinking, reverse image, and non-display are under control of the program and not directly available to the operator.

- Disk storage is used to hold the licensed program, a library of documents available for text processing functions, and transient storage of documents in process of distribution. The total document capacity will be influenced by a number of factors. See "Special Note" following.
- The diskette drive supports Diskette 2D. Each customer-supplied diskette (2D) holds approximately one million bytes of information. However, since the diskettes are removable, the total offline storage is limited only by the number of diskettes available.
- Each line must be designated as one of these types:
 - Local Device Control (LDC) (for attachment of 5219, 5229, 5257, 5258, 6670, and another 5525 System Unit), no more than eight LDC lines per 5525 (mdl-dependent).
 - Attachment to switched communication lines.
 - Attachment to nonswitched communication lines.

Note: A dedicated nonswitched SDLC communications line may also be used to attach a 6670 Information Distributor as a remote printer.

See 5520 programming pages for details of devices supported for remote attachment via communication lines.

- For multi-line configuration, the lines are controlled by a distribution controller (except on mdl 51, which requires a second controller for optional lines 9 to 16).

- The distribution controllers operate at specific numbers of bits per second and with specific number of receive buffers per line. The aggregate concurrent bps and concurrent buffer allocation requirements of devices attached to each controller should not exceed its specific capacities; see the "Special Note" below.
- Printers may be multidropped up to 1,524 cable-meters (5,000 cable-feet) radially from the System Unit on an LDC line. Maximum eight on one line (5525 mdl-dependent). 5219, 5229, 5257, 5258, and 6670 may be mixed on a single line. See "Special Note" following.
- The Mag Card Unit may be up to 4.6 meters (15 feet) from the System Unit. It is supported by Licensed Program 5611-SS2.
- 5525 System Units may be attached to other 5525 System Units on any LDC line via features #1702 and #1704. See following "Special Note".
- It is strongly recommended that the 5520 Performance Estimator be run whenever more than 18 5253 displays (Canada only > or Personal Computers or a combination thereof <) are attached to a mdl 51. Out of the 56 display stations that can be attached, 24 can be concurrently active. (18 active if all are performing 3270 functions.) Displays can be designated as "reserved" or "contention". To reduce sign-on contention, displays should not be designated as reserved unless absolutely necessary.

Special Note: The 5525 System Unit provides a large degree of configuration flexibility as already described, but there are some physical limitations as noted which must be applied, and also some practical limitations which must be respected for optimum performance of the system. System capacity and performance will be influenced by the nature of the work being undertaken, the format and content of documents being processed, and the incidence of concurrent activity.

Use of the Performance Estimator (AN5520) is highly recommended for guidance as to the viability of a given configuration in a described workload environment.

Configuration consistency and guidance may be obtained by use of the 5520 Administration System Online Configurator (CF5520).

Minimum Configuration:

- 5525 System Unit (mdl 20, 21, 30, 31, 32, 40, 50, or 51).
- 5253 Display Station or 5254 Dual Display Station.
- 96-character keyboard.

HIGHLIGHTS

The 5525 System Unit is the heart of the 5520 Administrative System and all other devices are attachable to it. It contains the circuitry for controlling and processing information flowing through the system, and internal storage for holding the licensed program and active documents. Attachable to the 5525 are:

- (Canada only > Multiple 5150 or 5160 Personal Computers (with the 5520 Administrative System's Personal Computer Attachment). If the 5150s or 5160s are connected to the 5525, the Personal Computer/Display Station Emulation Adapter (#2880) must be provided by the user. <)
- Multiple 5219s, 5229s (on mdl's 21, 31, 32, and 51), 5257s (impact printers), 5258s (ink jet printers), and 6670 Information Distributors.
- Multiple 5253 Display Stations and 5254 Dual Display Stations. (The 5254 Dual Display Station has been withdrawn from marketing.)
- A single 5321 Mag Card Unit.
- A single 6670 Information Distributor (SDLC) used as a printer (may also be remotely located). **Note:** In exceptional cases multiple 6670s may be attached.

- Other 5525 System Units on an LDC line.

In addition, optional attachments and controls for communication lines are provided and the licensed programs (5611-SS1 for mdls 20, 30, 40, and 50; 5611-SS2 for mdls 21, 31, 32, and 51) are available to support the system.

Highlights include:

- Choice of eight mdls giving wide range of attachment capability, internal storage, and processing power.
- Multiple integrated processors and controllers to enhance performance and facilitate overlap capability.
- Integrated nonremovable disk storage standard on all mdls.
- Configuration flexibility through multiple local attachment lines and optional attachment of remote devices via communications lines for document distribution.
- Diskette read/write capability standard on all mdls to archive/retrieve documents for document distribution.
- Optional attachment for document distribution to switched and/or nonswitched communication lines operating at up to 4800 bps switched or up to 9600 bps nonswitched (with either BSC or SNA/SDLC protocols per line supported by Licensed Program 5611-SS1 for mdls 20, 30, 40, and 50 and by Licensed Program 5611-SS2 for mdls 21, 31, 32, and 51).
- Keylock option.
- Optional attachment of the 5321 Mag Card Unit (see 5520 programming pages for limitations).
- Modem flexibility:
 - Optional EIA RS-232-C or CCITT V.24/V.28 recommended interface.
 - Optional business machine clocks to support modems which do not have clocking facility (1200 bps).
 - Auto-answer standard.
 - Auto-call feature option on all switched communication lines meeting the EIA RS-366 or CCITT V.24-200 series/V.25/V.28 recommended interface.

Problem Determination Procedures: Problem determination and recovery procedures are provided by IBM with the 5525 supported by the 5520 Administrative Processing Programs (5611-SS1 and 5611-SS2), and include the use of the 5219, 5229, 5253, 5254, 5257, and 5258. These procedures help provide increased availability of the System Unit and of the system itself by assisting with problem determination and either recovery or work-around procedures for certain types of device or system problems. The procedures are described in material accompanying the attached units (see relevant sales manual pages for details) and in the HELPs and message facilities of the program as well as the following manuals:

IBM 5219/5229 Printer Operators Guide, GA23-1009
 IBM 5257 Printer Operators Guide, GA23-1004
 IBM 5258 Printer Operators Guide, GA23-1005
 IBM 5520 Administrative System:
 Messages & Recovery Aids Manual, SC23-0733, for 5611-SS1
 Recovery Aids Manual, SC23-0756, for 5611-SS2
 Messages Manual, SC23-0749, for 5611-SS2
 (Canada only > IBM 5520/Personal Computer Attachment Program User's Guide, P/N 7033705 <)

These procedures are designed to be easy to follow and use by the customer, and it is the customer's responsibility to follow them prior to calling for IBM service.

5525 System Unit: The System Unit consists of frames, covers, power supplies, cable, logic circuits, and processors. It is composed of a processing unit, disk storage, memory, a diskette drive, facilities for addressing storage and performing processing, stand-

ard I/O control, optional additional I/O control, and optional communications control.

Processing Unit:

- Multiple processors and controllers operate in parallel.
- Data and instructions are stored as EBCDIC characters (8-bit byte plus ninth bit for parity checking) in storage.
- I/O and processing are overlapped except for diskette and disk data transfer with other disk read/write operation.

Disk Storage:

- Integrated, nonremovable disk storage.
- Access time 27 millisecond average, excluding rotational delay.
- Up to 1.031 megabytes/second data transfer rate.

Diskette Drive: The diskette drive supporting Diskette 2D.

- Standard on mdls 20, 21, 30, 31, 32, and 40.
- Facilitates offline transfer of documents between 5525s.
- Archive/retrieve facility for offline storage, backup, or security of document library.
- Diskette affords the use of removable, economical high capacity reusable media.
- Read/write operations are overlapped with processing and other device functions except disk storage data transfer.
- Stores up to one million bytes of data per diskette in double-density recording.

Diskette Magazine Drive: The diskette drive supporting Diskette 2D.

- Standard on mdls 50 and 51.
- Transfers data at speeds up to 125KB per second.
- Accepts two 10-diskette magazines.
- Up to three diskettes may be manually loaded in addition to the magazines.
- Same functional benefits as for diskette drive.

Display Station Control:

- Standard on all mdls.
- Provides for 3270 Emulation for mdls 21, 31, 32, and 51 with Function Extension (#3270) on (Canada only > or on 5150 or 5160 Personal Computers emulating a 5253 <) See PP 5611-SS2 pages for keyboard and language support.
- Provides for direct attachment of the (Canada only > 5150 or 5160 to the <) 5253 and the 5254.
- Up to 56 display stations are attachable (mdl-dependent).
- Four cable ports on mdls 20, 21, 30, 31, and 32 and eight on mdls 40, 50, and 51 are standard for the attachment of the display stations.
- Twinaxial cabling allows up to seven display stations to be connected to a single port (mdl-dependent).
- Maximum allowable cumulative length of each cable is 1,524m (5,000 feet).

Printer Attachment:

- Special features allow attachment of up to 12 printers (5525 mdl-dependent).
- 5219 and 5257 Printers providing high-quality impact print wheel printing.
- 5229 Printer provides high-quality impact print wheel printing requiring paper sizes up to 19 inches wide with a 17-inch writing line (mdls 21, 31, 32, and 51 only).
- 5258 Printer providing high-quality non-impact ink jet printing.
- 6670 Information Distributor (SDLC) providing high-quality non-impact laser printing. Note: Some means of creating Mag Cards is required to support this attachment.
- Twinaxial cabling allows up to eight intermixed 5219s, 5229s, 5257s, 5258s, and 6670s to be attached to a single port (mdl-dependent). Note: It is not recommended to intermix a

6670 with another printer on the same line where printer performance is a key concern.

- Maximum allowable accumulative length of each cable is 1,524m (5,000 feet). Note: A 5525 System Unit may be substituted for a printer on a line attached via features #1702 or #1704. This is an alternative to attaching a 5525 via communications line for document distribution. In such a configuration, the primary system unit controls any printers on that line. Note also that a 6670 Information Distributor (SDLC) may be remotely located as a printer to the system via a dedicated nonswitched SDLC communications line. Line speed options will normally be 4800 bps for the 6670 mdl 1 and 9600 bps for the 6670 mdl 2.

System Unit Attachment: 5525 System Units may be attached to other 5525 System Units on any LDC line via features 1702 or #1704 by using 5525 Cable-Thru (#2680). These features will also allow attachment of 5525 System Units on LDC lines shared with printers. However, in such a configuration the primary system unit controls any printers on that line.

Mag Card Attachment:

- Special feature allows attachment of a 5321 Mag Card Unit, cable-connected up to 4.6 meters (15 feet) from the 5525.
- Mag cards may be read or recorded (within limits) to assist, for example, with the conversion of existing mag card libraries. See 5520 programming pages for limitations.

Document Distribution: Control for Document Distribution Communications Facilities is provided by optional special features on the 5525 System Unit with Licensed Programs 5611-SS1 and 5611-SS2. Up to 16 communication lines are supported depending upon the mdl of the System Unit and number of lines allocated for printers. BSC and SNA/SDLC line protocols are provided.

- Point-to-point switched or nonswitched.
- Multipoint (nonswitched and SDLC only).
- Transmission rate up to 9600 bps (nonswitched) or 4800 bps (switched).
- Auto-answer or manual answer (modem-dependent).
- Optional Auto-Call feature for external modems meeting the EIA RS-366 or CCITT V.24-200 series/V.25/V.28 recommended interface.
- Optional EIA RS-232-C or CCITT V.24/V.28 recommended interface.
- BSC support to a variety of communicating IBM office machines and to a S/370 host.
- SNA/SDLC support to other 5525s or a S/370 host remotely attached (also to 5219s, 5229s, 5257s, 5258s, 6670s, and other 5525s locally attached).

Customer Responsibilities: The customer must be advised in writing of certain responsibilities related to the installation and maintenance of communications facilities/services as well as the IBM equipment. For further information, see M2700 pages.

The marketing representative must have the customer obtain a firm installation date for the start of transmission services (including any required modems) prior to Order Confirmation.

Customers should be reminded that they are responsible for conforming the use of the system to applicable statutes and regulations relating to the distribution of information both within their country and also to, from, or between other countries.

(Canada only) Customers should be advised of their responsibility for problem determination of the 5150 or 5160 when using hardware feature #2887, or software features #2880, #2884, or #2888 for attaching the 5150 or 5160. <)

Publications: "IBM 5520 Administrative System Introduction", GC23-0702, "IBM 5520 Administrative System Installation Manual - Physical Planning", GA23-1002, for mdls 20, 30, 40, and 50; or GA23-1011, for mdls 21, 31, 32, and 51, "IBM 5520 Administrative System Messages", SC23-0749, and "IBM 5520 Administrative Sys-

tem Recovery Aids", SC23-0756, for mdls 21, 31, 32, and 51; or SC23-0733 for mdls 20, 30, 40, and 50).

SPECIFY

- Voltage (AC, 1-phase):

50 Hz	60 Hz
200V #2806	208V #9884
220V #2813	230V #9886
235V #2814	

- Power Cord: Standard power cord is 2.4 meters (8 feet), no specify required.
- Color: Pearl White (no specify required).
- Operator Console: Language code for the console panel (nomenclature). One must be selected.

Canadian French #2934	German #2929
English US #2924	Italian #2932
French #2928	

- Cover: No specify required.
- Cables: One modem cable is required for attaching the 5525 to each switched or nonswitched communications line when an external modem is used. Specify #9152 for a 6 meter (19.7 foot) EIA Interface cable, and #9153 for a 12m (39.4 foot) EIA Interface cable.
- One auto-call cable is required for each pair of auto-call lines attaching the 5525 with Auto-Call to each communication facility. Specify #9154 for a 6 meter (19.7 foot) cable, and #9155 for a 12m (39.4 foot) cable.
- Attachment: Attachment of 5219, 5229, 5257, 5258, 5321, 6670, and another 5525 requires special features. See "Special Features".

SPECIAL FEATURES

Non-Communications Features

5321 Mag Card Unit Attachment (#1100): Required to attach the 5321 Mag Card Unit mdl 1 to the 5525. A 4.6m (15 foot) attachment cable and connector is included with the 5321. Maximum: One. Field Installation: Yes.

Local Printer Attachment (#1105): (Mdls 20, 21, 30, 31) Provided to attach 5219, 5229 (mdls 21 and 31 only), 5257, 5258, and/or 6670 through a single port to a 5525 where document distribution is not required. Customer-supplied twinaxial cable and connector is required to attach the printers. Note: Due to speed limitations, this attachment is not recommended for the 6670 where printer performance is a key concern. Limitations: For mdls 20, 21, 30, and 31 only. On mdls 20 and 21, the rated speed of the feature is 1200 bps and a maximum of three printers can be attached. On mdls 30 and 31 the rated speed of the feature is 2400 bps and a maximum of four printers can be attached. Requires Local Device Control (#4710) and LDC Attachment (#4715) to attach the printers. Maximum: One. Field Installation: Yes.

Keylock (#4650): Replaces on/off power switch to help protect against unauthorized use. Two keys are shipped with this feature. Additional keys may be purchased from IBM (vendor will supply additional keys only to original purchaser of the keys). See "Accessories" for order information. Maximum: One. Field Installation: Yes.

Local Device Control (#4710): (Mdls 20, 21, 30, 31, 32) Required to attach 5219, 5229 (mdls 21, 31, or 32 only), 5257, 5258, and/or 6670 to a 5525 System Unit. Requires LDC Attachment (#4715) and Local Printer Attachment (#1105). Maximum: One. Field Installation: Yes.

LDC Attachment (#4715): Cable and connector assembly for connecting 5219, 5229, 5257, 5258, and 6670 to the Local Device Control. See "Distribution Controllers" for specifics. Maximum: Two. Field Installation: Yes.

Communications Features

The communications features are designed to operate at line speeds up to 9600 bps (nonswitched) or 4800 bps (switched, point-to-point) on a common carrier facility or equivalent privately-owned communication facility.

In conjunction with licensed programs (5611-SS1 and 5611-SS2), optional distribution controllers and features permit the 5520 Administrative System to function for document distribution host communications and/or 3270 emulation on switched or nonswitched, either public or private, communications lines. The 5219, 5229 (for mdls 21, 31, 32, and 51), 5257, 5258, and 6670 or 5525 System Units are also attached via a twinaxial cable to the 5525 through these same controllers. These lines interface to the distribution controllers through line adapters. A single adapter provides both BSC and SDLC capability (each adapter can accommodate two lines and can function in any combination of BSC or SDLC) to a selected set of devices (defined by program control).

Each distribution controller (maximum of one in each of 5525 mdls 20, 21, 30, 31, 32, and 40, and maximum of two in each of 5525 mdls 50 and 51) has an aggregate data rate capability of 19.2K bps. This aggregate data rate allows flexibility in configuring the devices and communications facilities that attach to these controllers.

The distribution controllers will allow the 5520 Administrative System to communicate on nonswitched and/or switched point-to-point lines at speeds up to 4800 bps or 9600 bps if nonswitched. See M2700 pages for information on communication facilities. These distribution controllers will operate in half-duplex mode over dial (switched network) facilities, and in half-duplex mode over non-switched (or equivalent private) communication lines which may be 2- or 4-wire half- or full-duplex facilities. Operation of the features will be overlapped at all transmission rates with processing and I/O device operations. Units at each termination or drop point of a data link to which the 5520 Administrative System is attached must use the same clocking source (modem or business machine clock) and must operate at the same transmission rate and use the same transmission code. Compatible modems must be used at all terminations. The switched network environment includes support for manual dial or Auto-Call (optional feature) and manual or auto-answer (where the attached modem supports this capability) operations.

The 5525 supports attachment of the following devices in remote environments for the purpose of document distribution only, as supported by Licensed Programs 5611-SS1 and 5611-SS2. See programming pages for more details.

- Another 5525 - SNA/SDLC
- Office System/6 (6/420, 6/430, 6/440, 6/442, 6/450, 6/452) - BSC*
- 6580 Displaywriter System - BSC*
- 6640 Document Printer - BSC*
- 6670 Information Distributor - BSC*
- Mag Card II Typewriter - BSC*
- 6240 Mag Card Typewriter - BSC*
- Series/1 (suitably programmed) BSC*
- System/32 with Word Processing (#6002) - BSC
- System/34 (suitably programmed) BSC*
- System/38 (suitably programmed) - BSC
- Host S/370 (suitably programmed) - SNA/SDLC or BSC

* See 5520 programming pages for limitations

The 5525 can communicate via the EIA RS-232-C or CCITT V.24/V.28 recommended interface to external modems. The line protocol is BSC or SDLC as provided in the complementary communication feature at the remote device. Transmission speeds of up to 4800 bps (if switched) and up to 9600 bps (if nonswitched) are possible. These communications may be over switched or nonswitched facilities (point-to-point), and the switched lines can be manual or optionally auto-dial, manual, or auto-answer.

Auto-Call (#1315, #1316): Provides for unattended initiation of transmission on the switched network communications lines. Provides functions for four lines. #1316 is for #1702 only. See "Specify" for cable ordering. Maximum: See "Feature Configurator". Field Installation: Yes.

Distribution Controllers: The Communication/Printer-One (#1704) distribution controller is mutually exclusive with the Local Printer Attachment (#1105). #1702 provides an additional controller and additional ports for mdls 50 and 51 only, and requires Expansion Gate (#3600). These distribution controllers provide a variable number of printer/communication ports as shown in the table below, which also indicates the prerequisite controller features.

Distribution Controller Configurator

Feature	Available on 5525 mdls										Lines per Sys W/Feat +Prereq	
	20	21	30	31	32	40	50	51	n	x	M i a	M
Local Pr Att #1105	X	X	X	X	X						1	1
Power Expansion #5550*					X	X	X	X	X			
Comm Pr One #1704	X	X	X	X	X	X	X	X	X		2	2
Line Adapters, Add'l (#4700)			X	X	X	X	X	X	X		4	8
Expansion Gate (#3600)							X	X				
Dist. Controller, 2nd (#1702)								X	X		8	12
Line Adapters, Add'l (#4701)								X	X		10	16

Notes:

* #5550 is a prerequisite for #1704 on mdls 31, 32, 50, 51. #5550 is required on mdl 40 for the second #4700.

** These mdls require one #4700 with #1704.

*** Maximum number of lines is mdl dependent. Each #4700 provides for attachment of 2 lines via #1704 (maximum of three #4700).

**** Each #4701 provides for attachment of 2 lines via #1702 (maximum of two #4701).

Those ports not used for printer attachment may be used for communications, except on #1105.

Distribution Controller, 2nd (#1702): Provides four additional printer/communication ports on the 5525 mdls 50 and 51. The number of ports may be expanded in increments of two to a maximum of eight by the inclusion of Line Adapters, Add'l (#4701). For printers (and/or another 5525) line attachment requires Local Device Control (#4712). For communication line attachment requires the EIA Interface (#3702). Limitations: A maximum of eight ports per 5525 may be allocated for printer attachment. Maximum: One. Field Installation: Yes. Prerequisites: #1704, #3600.

Communications/Printer-One (#1704): Provides two printer or communications ports on all mdls of the 5525. Used on mdl 50 or 51 as a prerequisite to #4700 only. For printer (and/or another 5525) line attachment requires Local Device Control (#4711). For communi-

cation line attachment requires the EIA Interface (#3701). Maximum: One. Field Installation: Yes.

For features attachable to the distribution controllers, see "Feature Configurator" and the descriptions which follow.

Business Machine Clock (#1750, #1751): Provides communications clocking (timing) for two modems which do not provide the function. #1751 is for #1702 only. Maximum: See "Feature Configurator". Field Installation: Yes.

5525 Cable-Thru (#2680): Allows one or more 5525 System Units to be connected on an LDC line along with 5219, 5229 (for mdl 21, 31, 32, and 51), 5257, 5258, and 6670. This feature provides for connecting up to eight printers or 5525s in any sequence on a single LDC line. Maximum: One. Field Installation: Yes. Note: If the 5525 System Unit connected via this feature is the last in a line, a Screw-On Terminator is required (see "Accessories").

Expansion Gate (#3600): Required for the installation of the second distribution controller (#1702) on mdl 50 and 51 only. Maximum: One. Field Installation: Yes.

EIA Interface (#3701, #3702): Provides a cable (see "Specify") and interface for connecting low-/medium-speed modems meeting RS-232-C characteristics. Non-IBM modems may be attached subject to the Multiple Supplier Systems Policy. #3702 is for #1702 only. Maximum: See "Feature Configurator". Maximum number of EIA plus LDCs per controller is mdl-/feature-dependent. Field Installation: Yes.

Line Adapters, Add'l (#4700, #4701): Provides for attachment of additional pairs of lines on several 5525 mdl. #4700 provides for #1704 on mdl 30, 31, 32, 40, 50, and 51. #4701 provides for #1702 on mdl 50 and 51. Mdl 50 and 51 require a minimum of one #4700 with #1704. Maximum: See "Feature Configurator". Field Installation: Yes.

Local Device Control (#4711, #4712): Required to attach 5219, 5229 (mdl 21, 31, 32, or 51), 5257, 5258, 6670, and/or 5525 System Units to a distribution controller (#4712 is for #1702 only). One per line. Requires LDC Attachment (#4715), one per up to four printer lines. Maximum: See "Feature Configurator". Field Installation: Yes.

LDC Attachment (#4715): Cable and connector assembly required for connecting 5219, 5229 (mdl 21, 31, 32, or 51), 5257, 5258, 6670, and/or 5525 System Units to the Local Device Control (#4711, #4712). One serves up to four printer lines. Maximum: See "Feature Configurator". Field Installation: Yes.

Power Expansion (#5550): Provides additional power for communications on mdl 31, 32, 40, 50, 51. This feature is a prerequisite for #1704 on mdl 31, 32, 50, 51. #5550 is required on mdl 40 for the second #4700. Maximum: One. Field Installation: Yes.

Feature Configurator

	N	Local	
	O	Printer	
	T	Attach	
	E	#1105	
Feature	S	No.	Max
Auto-Call (4 lines)			
Bus Mach Clock (2 clocks)			
EIA Interface		3,4	
Line Adapt, Add'l (2 lines)		8	
Local Device Cntrl		3,4,5	#4710 1
LDC Attach (4 lines)		6	#4715
EIA 6m (19.7 ft) Cable		7	
EIA 12m (39.4 ft) Cable		7	
Auto-Call 6m(19.7 ft) Cbl		7	
Auto-Call 12m(39.4 ft) Cbl		7	

2nd Dist
Cntrlr

Feature

Auto-Call (4 lines)	#1316	2
Bus Mach Clock (2)	#1751	4
EIA Interface	#3702	8
Line Adapt, Add'l (2 1)	#4701	2
Local Device Control	#4712	8
LDC Attach (4 1)	#4715	
EIA 6m (19.7 ft) Cable	#9152	
EIA 12m (39.4 ft) Cable	#9153	
Auto-Call 6m (19.7 ft) Cbl	#9154	
Auto-Call 12m(39.4 ft) Cbl	#9155	

Comm/Print
One #1704
Note 2
No. Max

Feature

Auto-Call (4 lines)	#1315	2
Bus Mach Clock (2)	#1750	4
EIA Interface	#3701	8
Line Adapt, Add'l (2 1)	#4700	3
Local Device Control	#4711	8
LDC Attach (4 1)	#4715	
EIA 6m (19.7 ft) Cable	#9152	
EIA 12m (39.4 ft) Cable	#9153	
Auto-Call 6m (19.7 ft) Cbl	#9154	
Auto-Call 12m(39.4 ft) Cbl	#9155	

Notes:

1. Requires Expansion Gate (#3600). #1702 is shipped with four lines.
2. Requires Power Expansion (#5550) as a prerequisite on mdl 31, 32, 50, 51, and on mdl 40 with second #4700. #1704 is shipped with two lines.
3. Mutually exclusive (per line).
4. The sum of the Local Device Controls and EIA Interfaces cannot exceed the number of available lines.
5. Requires LDC Attachment (#4715). No more than eight LDC lines per 5525.
6. Maximum two per system.
7. Each line requires one if feature installed.
8. One #4700 is required with #1704 on mdl 50 and 51.

Licensed Programs: Licensed Program 5611-SS1 (for mdl 20, 30, 40, and 50) and Licensed Program 5611-SS2 (for mdl 21, 31, 32, and 51) should be ordered at equipment order entry time. See Licensed Programs 5611-SS1 or 5611-SS2 for additional information.

The 5520 Administrative Processing Programs (5611-SS1 and 5611-SS2) are used for the selection of certain data communications characteristics such as answer tone control, line type, station address, etc.

References: See M2700 pages for additional information concerning modems, communications facilities, machine attachment requirements, terminal intermix, and operating capabilities. Refer to "IBM 5520 Administrative System Installation Manual - Physical Planning", GA23-1002 or GA23-1011, for physical installation requirements.

MODEL CONVERSIONS MDLS 20, 30, 40, 50 CONVERSIONS (NO LONGER AVAILABLE)

Model conversions are field installable.

When the 5525 model changes, the licensed program must be re-ordered since it contains mdl-dependent code variations.

Any model upgrade that involves a disk storage capacity change may require replacement of the disk storage mechanism. Adequate provision must be made for retaining the data contained on the re-

placed disk mechanism and elimination of user proprietary information.

The upgrade purchase prices for model conversions may be greater than the purchase price differentials. The customer should carefully evaluate future requirements when purchasing a system.

Replaced parts from any model conversion that includes disk storage capacity change become the property of IBM. Replaced or purchased parts from any special feature installation or removal remain the property of the customer.

ACCESSORIES

Cables: The cables and/or associated parts to attach a 5525 to a printer line on a primary 5525 may be purchased from IBM or from a customer-selected source. For the description of these cables and parts, see the "5520 Administrative System Installation Manual - Physical Planning", GA23-1002 or GA23-1011. The customer is responsible for the installation and maintenance of these cables and their associated parts. When cabling is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the 5525.

Twinaxial Connector Kit (P/N 7362268): Includes two connectors. Twinaxial Wire and one connector kit are required for each attachment cable. (Individual connectors P/N 7362229 are available for replacement.)

Twinaxial Wire (P/N 7362211): Order must specify the desired length. Twinaxial Wire and one connector kit are required for each attachment cable. (This is an indoor/outdoor cable.)

Twinaxial Cable Assembly (P/N 7362267): Includes a connector kit (two connectors) attached to bulk wire. The required length of wire must be specified on the order. The cost of the wire must be added to the fixed assembly price to obtain the total price of the cable assembly.

Twinaxial Adapter (P/N 7362230): Permits two Twinaxial Cable Assemblies to be joined together.

Twinaxial Station Protector (P/N 6819750): One is required at each end of each twinaxial attachment cable installed outdoors (either above or below ground level). Note: This station protector is different from that used with the displays.

(Canada only > **Screw-On Terminator (P/N 7362188):** One is required on the last 5525 System Unit on a shared LDC line for the last display station on a line if it is a 5150 or 5160.

Twinaxial T-Connector (P/N 6851187): One is required for each 5150 or 5160 that is to be attached to the 5525. The use of this connector is discussed in the IBM Personal Computer/Display Station Emulation Adapter Installation and Problem Determination Procedures Manual, P/N 7033710. A cable P/N 7362267, maximum length 30.5cm (1 foot) and minimum length 20.3cm (8 inches), must be supplied with the T-connector. <)

(Canada only > **Installation Convenience Kit:** May be ordered for connecting 5150 (#2890 P/N 6092541) or 5160 (#2882 P/N 6109564) Personal Computers to the 5525. The kit contains:

- Personal Computer/Display Station Emulation Adapter
- 5520/Personal Computer Attachment Program
- Twinaxial T-Connector P/N 6851187
- Cable P/N 7362267
- Plus all necessary manuals and 5-1/4 inch diskettes to install, diagnose, and use the 5520/PC attachment program.

These kits may be ordered <) (Canada only > as stand-alone feature codes or as features associated with personal computer orders. These kits are not to be associated with 5520 orders. <)

SUPPLIES

For ordering information, contact IBM.

Diskettes: Only diagnostic diskettes are shipped with the 5525. Diskettes for customer uses must be ordered separately.

Diskette Magazines: Diskette magazines may be ordered, P/N 2462521. Diskettes are not shipped with the magazine.

5531 INDUSTRIAL COMPUTER

PURPOSE

The 5531 is an industrialized version of the IBM Personal Computer XT to be used in plant floor areas. The 5531 is designed for use in plant floor environments that are more physically demanding than a typical office location. To operate in these locations, the 5531 has been designed to meet certain industrial environmental conditions. These conditions are summarized as follows:

- Extended temperature operation
- Extended vibration and shock operation
- Extended voltage transients operation
- Extended particulates operation

The 5531 provides plant floor personnel with a system capable of handling computer applications in the plant floor environment. The 5531 supports all of the functions of similarly configured IBM Personal Computer XT's.

MODELS

Model 011: System Unit/Keyboard, 256KB Memory, one 5-1/4 Inch Double-Sided Diskette Drive, (formatted capacity of up to 360KB), a 5-1/4 Inch Diskette Drive Adapter, and a Combination Adapter.

Prerequisites: An IBM 5532 Industrial Color Display, an IBM 7534 Industrial Graphics Display, or suitable video display, and a display adapter are required for video output.

Customer Setup (CSU): The 5531 and its options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each machine and option. Setup service is available from the IBM National Service Division at IBM hourly rates and minimums, or by a Contract Support Service (CSS) Agreement.

HIGHLIGHTS

- The 5531 System Unit is a table-top unit which houses the microprocessor.
- Each 5531 comes with a Keyboard, 256KB of memory installed on the system board, one 5-1/4 Inch Double-Sided Diskette Drive (formatted capacity of up to 360KB), a 5-1/4 Inch Diskette Drive Adapter, and a Combination Adapter. In addition, 40KB of read-only memory (ROM), eight system expansion slots, a speaker which can be programmed to produce tones, a power supply, a cooling fan with replaceable filter and a thermal sensor are standard. The system can be further expanded through options that provide additional configuration flexibility.
- The Combination Adapter offers a fully programmable asynchronous communication port, a parallel interface port for printer attachment, a battery-backed clock and a thermal sensor interface. DOS support modules for the clock and thermal sensor are shipped with the system.
- A cover door for the disk/diskette area is provided to facilitate the addition of an optional, user-installable, key lock. With the addition of the key lock option, the access to the disk/diskette area can be restricted.
- The 83-key keyboard offers commonly used data and word processing functions in a design that combines the familiar typewriter and calculator keypad layouts. Special symbols, such as those used to draw lines, may be accessed with a combination of keys. The keyboard is attached to the system unit with a coiled cable, permitting adaptation to a variety of work environments. Depending on the application program, up to 40 special function keys can be supported.

- Additional memory increments of 64KB are available for installation on expansion feature cards. The maximum memory capacity is 640KB.
- The following features are supplied as standard with the 5531:
 - Intel 8088 Microprocessor
 - 256KB random access memory
 - 40KB read-only memory
 - 5-1/4 Inch Double-Sided Diskette Drive
 - 5-1/4 Inch Diskette Drive Adapter
 - Combination Adapter:
 - ▲ Asynchronous communication port
 - ▲ Parallel interface port
 - ▲ Battery-backed clock
 - ▲ Thermal sensor interface
 - BASIC language interpreter in read-only memory (ROM) built into every system unit
 - Automatic power-on self-test of system components
 - Full 128-character ASCII character set plus special graphics and control characters for a total of 256 characters
 - Built-in speaker
 - Eight system expansion slots. Six of the slots are full-feature slots that will accept full-size feature cards. The remaining two are special slots that will accept smaller feature cards. A retainer bar is provided to secure the feature cards in place. The 5531 makes use of one full-feature slots and one special slot. The full-feature slot is used for the Diskette Drive Adapter, and the special slot is used for the Combination Adapter.
 - 83-key Keyboard and attachment:
 - ▲ Sealed membrane design of the IBM Personal Computer keyboard
 - ▲ Detached with adjustable angle
 - ▲ Simple coiled cable connection
 - ▲ 83 full-travel keys with full function for data processing and text processing
 - ▲ Ten-key keypad for numeric entry and cursor control
 - ▲ Buffered input
 - ▲ Automatic repeating feature on all non-control keys
 - ▲ Print-screen key transfers display image to printed page
 - ▲ Access to all 256 characters via "Alt" key
 - ▲ Ten program-supported function keys for a total of 40 possible functions using keyboard shift keys
 - ▲ Insert and delete modes
 - Disk/Diskette Cover Door:
 - ▲ Plastic door with manual lock mechanism
 - ▲ Fits over disk/diskette system unit area

TECHNICAL INFORMATION

System Unit Technical Data

- Intel 8088 Microprocessor
- 4.77 MHz clock speed
- 410ns cycle time
- 40KB read only memory (ROM)
- 256KB random access memory on system board, 640KB system maximum
- 200ns memory access time
- 345ns memory cycle time
- Memory parity checking
- Eight feature slots (six full-feature, two smaller slots) with retainer bar to secure feature cards
- 130 watt power supply
- Cooling fan with replaceable filter
- Dimensions:
 - Width - 496mm (19.5 in.)
 - Depth - 455mm (17.9 in.)

- Height - 152mm (6 in.)
- Weight: Approximately 14.97kg (33 lbs.)

Keyboard Technical Data

- Dimensions:
 - Width - 500mm (19.6 in.)
 - Depth - 200mm (7.87 in.)
 - Height - 57mm (2.2 in.)
- Weight: 2.13 kg (4.7 lbs.)

Specified Operating Environment

- Electrical:
 - AC operating voltages: 100V minimum to 125V maximum, frequency 57 Hz to 63 Hz
 - Power line lightning surges of +/- 2,500 Volts, as outlined in FCC Docket 19528 - Part 68
- Air Temperature:
 - System on: 4 degrees to 46.1 degrees C (39.2 degrees to 115 degrees F)
 - System off: 4 degrees to 51.7 degrees C (39.2 degrees to 125 degrees F)
- Relative humidity: 8 percent to 80 per cent (non-condensing)
- FCC Class A
- Particulate contaminants filtering:
 - Suspended particulates: 500 micrograms per cubic meter
 - Benzene soluble organics: 30 micrograms per cubic meter
 - Setttable particulates: 1500 micrograms per square centimeter for 30 days
- Shock: 0.5G at 10 millisecond duration
- Vibration:
 - 5 to 17 Hz at 0.005 inches double amplitude displacement
 - 17 to 200 Hz at 0.07G peak
 - 200 to 500 Hz at 0.036G peak
- BTU output: Approximately 717 BTU/hr

Publications

- "IBM Personal Computer 3278/79 Emulation Adapter Technical Reference Manual Addendum" (#2336): Provides detailed information about the IBM Personal Computer 3278/79 Emulation Adapter (#2507) for users of the IBM Industrial Computer Technical Reference Options and Adapter (#6035).
- IBM Personal Computer 3278/79 Emulation Adapter Hardware Maintenance and Service Manual Addendum" (#2337): Provides detailed information about the IBM Personal Computer 3278/79 Emulation Adapter (#2507) for users of the IBM Industrial Computer Maintenance Information Manual (#6004).
- "IBM Industrial Computer Guide to Operations" (#6006): This manual provides information on problem determination procedures, operating the 5531, and moving the system.
- "IBM Industrial Computer Installation and Setup" (#6029): This manual provides information on how to unpack, setup and install the 5531.
- "IBM Industrial Computer Technical Reference" (#6003): This manual is designed to provide hardware design and interface information for the system unit. The publication also provides Basic Input Output System (BIOS) information as well as programming support material. The manual is intended for programmers, engineers involved in hardware and software design, designers, and interested persons who have a need to know how the IBM Industrial Computer is designed and works.

- "IBM Industrial Computer Technical Reference Options and Adapters" (#6035): This manual is designed to provide hardware design and interface information for the options and the adapters supported by the 5531. This manual is intended for programmers, engineers involved in hardware and software design, designers, and interested persons who have a need to know how the options and adapters are designed and work.
- "IBM Industrial Computer Maintenance Information Manual" (#6004): This manual provides step-by-step instructions that aid the user in identifying the failure of an IBM Industrial Computer Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the necessary information to complete the repair activity (i.e., adjustments, replacements, etc.).
- "IBM Personal Computer XT/370 Technical Reference" (#6732): This manual is designed to complement the Industrial Computer Technical Reference Options and Adapters (#6035) in that it provides hardware design and interface information for the XT/370 Option Kit.
- "IBM Personal Computer XT/370 Hardware Maintenance and Service" (#6731): This manual provides step-by-step instructions that aid the user in identifying the failure of an XT/370 Option Kit Field Replaceable Unit (FRU). When the FRU has been identified, the manual provides the necessary information to complete the repair activity.

SPECIFY

- Voltage (104-127V AC, 57-63 Hz): No specify required.

SPECIAL FEATURES

PC Network Adapter (#0213): The IBM PC Network is a low cost, broadband, local area network. It provides a reliable, low maintenance network using standard 75 ohm coaxial cable (CATV compatible) and standard broadband components. The network uses carrier sense multiple access/collision detect (CSMA/CD) protocol to transmit data at 2 million bits per second. The network consists of the IBM 5178 PC Network Translator Unit which provides single channel frequency translation for the network, the IBM PC Network Adapter (#0213) which attach IBM Industrial and Personal Computers to the network, and eight IBM PC Network Cabling Components which may be used to attach up to 72 IBM Industrial and Personal Computers within a 1,000-foot radius of the translator unit.

The IBM 5178 PC Network Translator Unit provides fixed frequency translation for the IBM PC Network. One translator unit is required for each network. The translator unit is supplied with a separately packaged 120-volt transformer which plugs into a standard grounded electrical outlet.

The translator unit has a connector assembly for attaching up to eight IBM Industrial or Personal Computers within a radius of 200 feet (cable segments may be purchased separately). The translator also has an expansion port for attaching the IBM PC Network Base Expander (#0230), which permits attachment of up to 64 additional Industrial or Personal Computers to the network, for a total of 72.

The IBM PC Network Adapter is a feature card that plugs into each IBM Industrial or Personal Computer in the network. It is supplied with a three-meter (9-foot) attachment cable which can be connected directly to, or within 200 feet of the IBM PC Network Translator Unit. The IBM PC Network Cabling Segments are used to extend the distance up to 200 feet.

The optional IBM PC Network Cabling Components contain a variety of preassembled wires and connectors that permit installation of a variety of network topologies. They are designed to extend the functional capabilities of the network. These cabling components can be used to increase the maximum number of attached stations from 8 to 72, and to increase the maximum distance of coverage from a radius of 200 feet to a radius of 1,000 feet. The cable component options which provide for end-to-end connection, include a

Base Expander, three Expansion Kits, and four Cable Segments preassembled from standard CATV components. Standard F connectors are used to connect cable components.

The IBM PC Network Base Expander (#0230) is required to grow the network to more than eight IBM Industrial or Personal Computers or more than a 200-foot radius from the translator unit. The base expander is a prerequisite for the attachment of up to eight Short, Medium, or Long Distance Kits in any combination. Each distance kit can attach up to eight IBM Industrial or Personal Computers. In addition, the medium and long distance kits extend the network by 400 feet and 800 feet, respectively. In combination with cabling segments, the short, medium, and long distance kits can extend the network up to a 1,000-foot radius from the translator unit.

Math Co-processor Option (#1002): The Math Co-processor option provides for the addition of the Intel 8087 Processor as a companion to the Intel 8088 to increase speed and precision in arithmetic, logarithmic, and trigonometric functions. The Option Kit provides a matched Intel 8088 along with the Intel 8087 to ensure high performance. The Intel 8087 multiplies 32-bit and 64-bit floating point numbers approximately 80 times faster than the Intel 8088. This option is supported only by IBM Personal Computer APL and the Macro Assembler "escape" instruction. Maximum: One. Field Installation: Yes. The customer is responsible for ensuring that the Math Co-processor Option is installed by a technically skilled person. It is recommended that IBM or an IBM authorized dealer install this option.

64KB Memory Module Kit (#1003): The 64KB Memory Module Kit provides a 64KB increment of parity-checked random access memory which may be plugged into available sockets on the 64/256KB Memory Expansion Option (#1013). The 64KB Memory Module Kits are sold as small, plug-in circuits with instructions for user installation. Maximum: The 64/256KB Memory Expansion Option provides 64KB of memory as standard. Up to three 64KB Memory Module Kit increments may be customer-installed on a 64/256KB Memory Expansion Option to provide an additional 192KB of memory. Field Installation: Yes. Prerequisites: Available sockets on a 64/256KB Memory Expansion Option. Customer Setup: Yes.

64/256KB Memory Expansion Option (#1013): The 64/256KB Memory Expansion Option provides increments of system memory by 64KB (65,536 bytes) and is easily expandable to 256KB by plugging in additional increments of 64KB with 64KB Memory Module Kits (#1003). The 64/256KB Memory Expansion Option is packaged as a circuit card designed to plug into one of the 5531's full-feature system expansion slots. Technical Information: Random access memory -- starting address is set by switches -- 200ns access time -- 345ns memory cycle time -- parity checking -- sockets for expansion to 256KB. Limitations: The 5531 supports a maximum addressable memory of 640K bytes. The combination of the 256KB installed on the system board, and any installed 64/256KB Memory Expansion Options, and 64KB Memory Module Kits, must not exceed a total of 640KB of memory. Maximum: Two. Field Installation: Yes. Prerequisites: The system board must have 256KB of memory. An available full-feature system expansion slot is required for each 64/256KB Memory Expansion Option. Customer Setup: Yes.

Enhanced Graphics Adapter (#1200): Provides support for the IBM 7534 Industrial Graphics Display and enhanced support for the IBM 5532 Industrial Color Display. The IBM Graphics Memory Expansion Card (#1201) expands the IBM Enhanced Graphics Adapter's 64KB memory to 128KB and increases the color range for 640 x 350 graphics from four colors to 16 colors. The IBM Graphics Memory Module Kit (#1203) expands the expansion's card memory to 256KB providing additional graphics function. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available full-feature system expansion slot.

The Enhanced Graphics Adapter:

- Supports the IBM 5532 Industrial Color Display or the IBM 7534 Industrial Graphics Display.
- Allows full 16-color graphics with the IBM 5532 Industrial Color Display in either 320 x 200 medium definition graphics or 640 x 200 high definition graphics modes.

- Provides 640 x 350 support in up to 16 colors for graphics on the IBM 7534 Industrial Graphics Display.
- Provides high quality (8 x 14 character box) text in color on the IBM 7534 Industrial Graphics Display.
- Allows users to select under program control from a palette of 64 colors when connected to the new IBM 7534 Industrial Graphics Display.
- Provides 64KB graphics memory on the IBM Enhanced Graphics Adapter expandable to 128KB with the Graphics Expansion Card.
- Expands graphics memory to 256KB with the Graphics Memory Module Kit. This added memory may be used to support smooth scrolling, panning (scanning sequentially through graphics memory), and additional pages of graphics data.
- Allows compatibility modes to execute programs written for the IBM Color/Graphics Monitor Adapter with the IBM 5532 Industrial Color Display. Composite video support for attaching analog monitors or TV sets is not provided.
- Allows RAM-resident character generator to be loaded from user programs allowing any set of 256 characters to be incorporated into applications.
- Allows character space expansion to 512 with the IBM Graphics Memory Expansion Card and to 1024 with the IBM Graphics Memory Module Kit.
- Allows character box sizes up to 32 dots high and 8 dots wide.

Binary Synchronous Communications Adapter (#1204): Provides an EIA RS-232-C interface. It is compatible with the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM Personal Computer AT. Limitations: Only one BSC Adapter may be installed if an SDLC (#1205) Adapter is installed on the same system. Maximum: Two. Cable: The Communications Adapter Cable (#2067) allows the user to connect the BSC Adapter to a modem via a plug at the rear of the 5531. The cable is double shielded and approximately 3m (10 ft.) long. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Software such as the BSC 3270 Emulation Program is required for communication. An external modem must be cable-connected between the BSC Adapter and the telephone line. Customer Setup: Yes.

SDLC Communications Adapter (#1205): Provides an EIA RS-232-C interface. It is compatible with the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM Personal Computer AT. Maximum: One. Cable: The Communications Adapter Cable (#2067) allows the user to connect the SDLC Communications Adapter to a modem via a plug at the rear of the 5531. The cable is double shielded and approximately 3m (10 ft.) long. A wrap connector is provided to test the cable. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Software such as the SNA 3270 Emulation and RJE Support Program (6024036) is required to allow communication. An external modem must be cable-connected between the SDLC Communications Adapter and the telephone line. Customer Setup: Yes.

Personal Computer Cluster Adapter (#1206): The Personal Computer Cluster Adapter provides the ability to connect the 5531, in a clustered multi-user configuration, consisting of other IBM Industrial Computers, and IBM Personal Computers. Maximum: Supports up to 64 computers in a cluster (actual number is dependent on performance characteristics). Each computer in the cluster beyond the first two requires an additional PC Cluster Cable Kit (#1207). The adapter requires an available full-feature system expansion slot.

Personal Computer Cluster Cable Kit (#1207): The Personal Computer Cluster Cable Kit provides easy connection of two IBM Computers (IBM Industrial Computers in combination with IBM Personal Computers).

Data Acquisition and Control Adapter (#1502): An analog and digital I/O card that can be plugged directly into the system unit. This option can be used in a scientific/industrial laboratory setting to control processes, monitor transducers (flow, pressure, temperature, etc.), and automate electronic testing. It requires a full-feature system expansion slot.

The IBM Data Acquisition and Control Adapter Distribution Panel (#1504) is an optional feature that provides easy access to the I/O signals, voltages, and grounds of the IBM Data Acquisition and Control Adapter. The distribution panel is connected to the adapter by a shielded cable. The distribution panel is a printed circuit board with four barrier-type screw terminal strips for a total of 88 terminations. A shielded flat cable with a 60-pin connector is permanently attached to the board. The cable and terminal board assembly is housed in a metal enclosure that is slotted to allow user cabling to enter or exit. The cable is approximately 34 inches long.

Up to four IBM Data Acquisition and Control Adapters can be attached to the 5531.

The Adapter Has:

- Four analog input channels (12-bit resolution)
- Two analog output channels (12-bit resolution)
- 16-channel digital input port
- 16-channel digital output port
- Programmable sampling rates provided by a 32-bit timer
- Event counter, programmable rate generator, or programmable time delay provided by a 16-bit user timer/counter

The Distribution Panel has:

- Screw terminals provided to attach devices to the distribution panel
- Multiple grounds for twisted pair terminations
- Shielded construction to minimize noise interference

Application areas that may be addressed with the IBM Data Acquisition and Control Adapter include:

- Chromatography
- Electrochemistry
- Energy management
- Electronic testing
- Process control
- Data logging
- Robotics

Some parameters commonly monitored or controlled include:

- Pressure
- Flow
- Temperature
- Displacement
- Voltage
- Light intensity
- Rotational speed

Some examples of instruments or devices that may utilize the Adapter are:

- Chromatographs
- Spectrophotometers
- Pressure gauges
- Relay controls
- Thermocouples
- Gas analyzers
- Humidity sensors
- Valve actuators
- Level gauges
- Load cells
- Conductivity cells
- pH meters

General Purpose Interface Bus Adapter (#1503): Provides an interface between the 5531 and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of multiple devices or instruments (such as plotters, multimeters, and disk drives). Up to four GPIB Adapters can be installed in a system unit. Each adapter requires a full-feature system expansion slot. The IBM GPIB Adapter can

perform as a controller, a talker, or a listener with compatible devices. The IBM GPIB Adapter also provides capabilities for data transfer between workstations, and the connection of several computers for sharing of instruments or peripheral I/O devices.

The IBM GPIB Adapter is designed to the ANSI/IEEE-488 standard, including the 488A-1980 supplement, and:

- Supports up to 14 devices or instruments
- Provides a direct memory access data rate of up to 300KB/second
- Provides a programmed I/O data rate of up to 20KB/second
- Allows user selection of direct memory access channels
- Allows user to select interrupt level

XT/370 Option Kit (#1509): This option, along with VM/PC 1.1, allows the 5531 to be a System/370 workstation. An IBM 3278/79 Emulation Adapter (#2507) may be installed with this XT/370 Option Kit in the system unit for a host 3278/79 session and data transfer.

Highlights of the XT/370 Option Kit and VM/PC 1.1 are:

- Support of unique concurrent sessions via "hot key":
 - Local System/370 CMS session
 - Host 3278/79 session via an optional 3278/79 Emulation Adapter that will provide a coaxial connection to an:
 - ▲ IBM 3274 Control Unit
 - ▲ IBM 4321/4331/4361 Processor via a Display/Printer Adapter
 - ▲ IBM 4361 Processor via a Workstation Adapter
 - ▲ IBM 4701 Finance Communication Controller via a Device Cluster Adapter (host server functions not supported)
 - Remote 3101 emulation session with IBM Personal Computer 3101 Emulation licensed program (6024042)
 - System/370 Processor Control Session
- Ability to execute many unaltered host System/370 VM/CMS programs
- Hardware relocate to support up to 4MB virtual addressing
- 5531 functional capabilities unchanged after this option kit is installed

The XT/370 Option Kit consists of two (PC/370-P and PC/370-M) cards that allows the 5531 to execute many of the System/370 instructions.

The PC/370-P card consists of three microprocessors, a page table and attendant circuitry.

The first microprocessor executes most of the commonly used fixed point System/370 instructions. It performs all instruction fetches and decoding and all effective address calculations. The general purpose registers (GPR) and program status word (PSW) are kept in this microprocessor.

The second microprocessor emulates the remaining non-floating point System/370 instructions, interprets the diagnose instruction, manipulates the page table, handles exceptional conditions, and performs hardware housekeeping as required.

The third microprocessor executes System/370 floating point instructions. The floating point registers are kept in this microprocessor.

The page table consists of two static RAM devices arranged in a 2048 x 12 array. Each virtual page is assigned to an entry in the page table. Each entry contains its real page number and status bits.

The PC/370-M card contains 512KB of parity checked RAM accessible from either the PC/370-P card or the microprocessor for the 5531. Concurrent requests for memory accesses are arbitrated, with the microprocessor for the 5531 accesses receiving highest priority.

The 512KB memory is viewed in native mode as a contiguous storage area that begins at the end of the 256KB of required memory in the 5531. However, in native mode the 5531 has 640KB of usable

memory. When in this native mode, this memory operates marginally slower than the 256KB of memory on the system board.

The PC/370-P card views the 512KB memory as two separate areas which are not contiguously addressable. The area from 0 to 480KB is addressed from 0 to 480KB and is real System/370 space. The area from 480KB to 512KB is control store for the second micro-processor on the PC/370-P card.

The optional features that are usable in an 5531 with an XT/370 Option Kit and VM/PC 1.1 are:

- IBM 3278/79 Emulation Adapter (#2507)
- IBM 5532 Industrial Color Display via a Color/Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) for local or host 3279 Mdl 2A or S2A emulation sessions.
- IBM 7534 Industrial Graphics Display via a Color/Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) for local or host 3279 mdl 2A or S2A emulation sessions.
- 10Mb fixed disk drive
- Double-sided diskette drive

Other optional features such as the following are not explicitly supported by the XT/370 Option Kit with VM/PC 1.1 but are supported in stand-alone (native) mode.

- Math Co-processor (#1002)
- PC Network Adapter (#0213)
- Binary Synchronous Communications Adapter (#1204)
- Synchronous Data Link Control Communications Adapter (#1205)
- PC Cluster Adapter (#1206)
- Data Acquisition and Control Adapter (#1502)
- General Purpose Interface Bus Adapter (#1503)
- Enhanced Display Station Emulation Adapter (#2879)

Maximum: One. Customer Setup: Yes. Field Installation: Yes. Prerequisites: Must be installed respectively in full-feature system expansion slots -- Software such as the VM/PC Licensed Program (6936733) -- A user-supplied coaxial cable to attach to a 3270 Controller -- 256KB of memory on 5531 System Board.

Asynchronous Communications Adapter (#2074): The Asynchronous Communications Adapter provides a channel to data processing or input/output devices outside the immediate system. Such devices can be connected by telephone using a plug-in modem, or directly by cable when the device is nearby. The communication "target" may be a large host computer, a Series/1, an IBM Personal Computer, another IBM Industrial Computer, a paper tape reader, a communicating typewriter, a laboratory instrument, or other machines providing the popular RS-232-C asynchronous interface. The Asynchronous Communication Adapter is flexible enough to match most of the computers and related products available in the micro-computer marketplace. The user's program selects the appropriate speed (50-9600 bps), format (5-, 6-, 7-, or 8-bit characters), parity and stop bits to reflect the attached device. Once communication has been established, the user's program performs reads and writes. Interrupts permit the program to perform data processing such as calculating, diskette reading or writing, or printing, and then pause to resume communications when a signal appears on the line. The adapter provides an EIA RS-232-C interface. One 25-pin "D" shell, male type connector is provided to attach various peripheral devices. In addition, a current-loop interface is located in the same connector. A jumper block is provided to select manually either the voltage or the current-loop interface. Maximum: One. Cable: A user-supplied communication cable is required for connection of external modems or other devices to the Asynchronous Communications Adapter. Field Installation: Yes. Prerequisites: An available special feature (small) or full-feature system expansion slot is required. Customer Setup: Yes.

3278/79 Emulation Adapter (#2507): The 3278/79 Emulation Adapter expands the capabilities of the 5531 by providing coaxial cable attachment to the 3274 Control Unit, the 4321, 4331 or 4361 Processor Display/Printer Adapter, or the 4701 Finance Communication Controller. When used with the 3278/79 Emulation Control Program (6024134), the 5531 can emulate the functions of a 3278 Display Station mdl 2 or a 3279 Color Display Station mdl 2A or S2A and can also support file transfer with the host. Both the host-controlled

3270 session and a local IBM Personal Computer DOS session can be active concurrently and the user can interact with either session alternately. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 5531 system unit full-feature expansion slot is required. A customer-supplied coaxial cable is required for host system attachment. Software such as the 3278/79 Emulation Control Program (6024134) is required. A 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required to allow for file transfer. For attachment to the 4321 or 4331, specify code #9843 must be installed on the 4321 or 4331. For attachment to the 4701, the Device Cluster Adapter (#3101) must be installed on the 4701. Limitations: File transfer is not supported when attached to the 4701. For additional information, limitations and prerequisites, see Product Announcement 183-137 dated October 18, 1983.

Enhanced Display Station Emulation Adapter (#2879): This option provides for direct attachment of the 5531 to the IBM System/34, System/36 and System/38, using the Enhanced 5250 Emulation Program. It can attach remotely via the 5251-12. The 5531 will emulate the 5250 workstation family displays and printers. The 5531 can also be attached to the System/36 or System/38 remotely via the 5294 Remote Control Unit.

The Enhanced Display Station Emulation Adapter is a printed circuit card that is installed in one of the 5531 full-feature system expansion slots. Also available is the integrated attachment cable (#2877) for connecting the adapter to the twinax line (line termination resistors are part of the cable assembly), an Installation and Problem Determination Procedures Manual and a 5-1/4 inch diskette containing diagnostic programs. The required external cables are available from IBM. The design of the circuit card allows the 5531 to establish one or two sessions with the System/34, System/36 and System/38. host device address(es) are set under program control.

Enhanced 5250 Emulation Installation Convenience Kit (#2880): This option includes all parts, software and manuals required to install the Enhanced Display Station Emulation Adapter and Enhanced 5250 Emulation Program in the 5531.

The Enhanced Display Station Emulation Adapter:

- Allows the 5531 to be connected as a workstation to the System/34, System/36, or System/38.
- Allows the 5531, when running the Enhanced 5250 Emulation Program, to emulate a 5291 or 5292-1 Workstation.
- Includes diagnostic aids.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Industrial Computer with a network adapter to the IBM Cabling System.

5-1/4 Inch Diskette Drive Adapter (#3780): The 5-1/4 Inch Diskette Drive Adapter provides for the attachment of the 5-1/4 Inch Double-Sided Diskette Drive. Maximum: One, included as a standard feature on the 5531. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

5-1/4 Inch Double-Sided Diskette Drive (#3810): The 5-1/4 Inch Double-Sided Diskette Drive allows the 5531 to read and write data on both sides of a soft-sectored 5-1/4 inch diskette. Formatted storage capacity is approximately 320KB (360KB with IBM Personal Computer DOS 2.0 or 2.1). The 5-1/4 Inch Double-Sided Diskette Drive is a standard feature and resides inside the 5531 to provide diskette access from the front. Technical Information: Track density of 48 tracks per inch -- 40 tracks per surface -- 2 data surfaces per diskette -- 300 rpm rotational speed -- access time of 6ms track to track -- 20,480 bytes per second data transfer rate. Maximum: Two. One is included as a standard feature on the 5531. A second one can be installed adjacent to the first one if the space is not occupied by a 10MB Fixed Disk Drive. Field Installation: Yes. Prerequisites: #3780. Customer Setup: Yes.

Monochrome Display and Printer Adapter (#4900): The Monochrome Display and Printer Adapter provides for the attachment of both a suitable monochrome display and a suitable printer. The adapter provides cable connectors for attachment of the printer and the display at the rear of the 5531. Limitations: The primary

monitor/display adapter must be installed in the 5531 System Unit. Maximum: One. Cable: The Printer Cable (#5612) is available to connect a printer to the Monochrome Display and Printer Adapter. Field Installation: Yes. Prerequisites: An available full-feature system expansion slot. Customer Setup: Yes.

Color/Graphics Monitor Adapter (#4910): The Color/Graphics Monitor Adapter provides for the attachment of a color display to the 5531. Either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5532 Industrial Color Display mdl 001, a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16-foreground and 8-background colors are supported in text (character) mode. This attachment also provides support for 4-color medium resolution graphics (320 dots horizontal, 200 dots vertical) and black and white high-resolution graphics (640 dots horizontal, 200 dots vertical). 256 characters are available in "text" mode, 128 in medium or high-resolution graphics. The adapter provides 16KB of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available full-feature system expansion slot.

IBM Token-Ring Network PC Adapter II (#5063): Allows the IBM Industrial Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS), and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media.

Combination Adapter (#6000): The Combination Adapter occupies one of special feature (small) system expansion slots on the 5531 and provides four main functions: an asynchronous communications interface, a parallel printer interface, a realtime clock, and a thermal sensor interface. Technical Information: The asynchronous communications interface is fully programmable and supports asynchronous communications only. All of the specifications of this interface match those of the standard Asynchronous Communications Adapter (#2074). The cable interface to the asynchronous communications port is via a 9-pin connector at the rear of the system unit. The parallel printer interface is specifically designed to attach printers with a parallel interface. All of the specifications of this interface match those of the standard Monochrome Display and Printer Adapter (#4900). The realtime clock has the following technical features: counter resolution from 1/10,000 of a second to a month -- 56 bits of RAM for realtime counter comparisons -- counter rollover indicator -- 32,768 Hz crystal oscillator -- four-year calendar (excluding leap year) -- 24 hour clock. The realtime clock is battery-backed while the system unit is powered down. The thermal sensor interface connects to a thermal sensor inside the system unit and allows the system processor to sense when the system unit is over its specified temperature range. A bit in the sensor port is set by the thermal sensor to indicate to the system software (DOS) that the system unit is over its specified temperature range. DOS support modules for the clock and the thermal sensor are shipped with the 5531. Maximum: One, included as a standard feature on the 5531. Customer Setup: Yes. Field Installation: Yes. Prerequisites: An available special feature (small) or full-feature system expansion slot is required. Cable: The Combination Adapter Cable (#6001) allows the user to convert the 9-pin Asynchronous Communications port of the Combination Adapter to a 25-pin "D" shell, male type connector for attachment to an external modem or other asynchronous devices.

Combination Adapter Cable (#6001): The Combination Adapter Cable allows the user to convert the 9-pin asynchronous communications port of the Combination Adapter to a 25-pin "D" shell, male type connector, suitable for attachment to an external modem or other asynchronous devices. The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. Customer Setup: Yes.

Keylock Option Kit (#6002): The Keylock Option Kit allows the user to replace the manual lock mechanism, standard in the Disk/Diskette Cover Door, with a key controlled lock mechanism. Customer Setup: Yes.

10MB Fixed Disk Drive and Adapter (#6017 and #6018): The 10MB Fixed Disk Drive provides storage for user programs and data. The disk drive has the same physical dimensions and mounting as the 320KB diskette drive. Technical Information: 512 bytes per sector -- 17 sectors per track -- 306 tracks per surface -- 4 surfaces -- 3,600 rpm -- 90ms average access time -- 5M bit per second transfer rate.

The Fixed Disk Drive Adapter provides the buffering, error detection, and data transfer between the 10MB Fixed Disk Drive and the 5531. Technical Information: 32-bit error-correcting code -- microprocessor controlled -- on-board sector buffers -- internal diagnostics -- direct memory access (DMA) data transfer -- high level command set -- automatic error detection and correction -- automatic retries on disk access.

The 10MB Fixed Disk Drive and Adapter is shipped installed in the 5531 if ordered as #6017. The 10MB Fixed Disk Drive and Adapter is shipped as a separate customer installable kit if ordered as #6018. Maximum: One. Limitations: Can not be installed if the space is occupied by another double-sided diskette drive. Field Installation: Yes (#6018). Prerequisites: An available full-feature system expansion slot for the adapter, and available space, adjacent to the standard double-sided diskette drive, for the fixed disk. Customer Setup: Yes (#6018).

IBM Realtime Interface Co-Processor (#6050, #6160, #6165, #6166): The IBM Realtime Interface Co-Processor is an interface subsystem for IBM Industrial Computers and IBM Personal Computers. A Realtime Interface Co-Processor (ARTIC) in conjunction with its software support provides support for attachment of Programmable Controllers in industrial applications.

The IBM Realtime Interface Co-Processor will be available with either 128KB or 512KB of standard memory and either 5.25 or 3.5-inch program media.

● Standard Features

- Advanced high-performance Intel(1) 80186 micro-processor
- 128KB or 512KB of dual-ported memory with parity for error detection (128KB expandable to 256KB, 512KB expandable to 1024KB)
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the co-processor storage and its interface ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Two serial I/O ports
- Data rates up to 64K bps full duplex with external clocking on one port, while the second port is operated at 19.2K bps full duplex.
- Transmit and Receive status-indicators
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support
- CRC generation and checking
- Pluggable Interface Boards
- Custom Interface Board support
- Byte-wide I/O Interface available at Interface Board Connector
- All external signals available at Interface Board connector
- Five programmable hardware timers
- Watchdog timer
- Watchdog timer status-indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - ▲ Hardware setup
 - ▲ Software setup
 - ▲ Problem determination procedures
 - ▲ Customer diagnostics diskette.
- Realtime Control Program microcode
 - ▲ Multi-tasking, preemptive priority
 - ▲ Co-Processor memory management

- ▲ Timer support
- ▲ Watchdog timer support
- ▲ Queue management
- ▲ Inter-task communications
- ▲ Initial Program Load.
- ROM-based automatic power-on self-test of Co-processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

● Optional Features

- EIA RS-232-C/CCITT V.24 Interface Board (#6051)
- EIA RS-422-A Interface Board (#6064)
- CCITT V.35 Interface Board (#6053)
- 20ma Current Loop Interface Board (#6066)
- Realtime Interface Co-Processor 128KB Memory Expansion (#6055) (can only be used with features #6050 and #6165)
- Realtime Interface Co-Processor 512KB Memory Expansion (#6161) (can only be used with features #6160 and #6166)
- RS-232-C Direct Attach Interface Cable (#6056)
- RS-232-C Modem Attach Interface Cable (#6057)
- IBM Realtime Interface Co-Processor Technical Reference (#6058)
 - ▲ Hardware technical information
 - ▲ Realtime Control Program microcode description
 - ▲ Interface Board design information.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (#6059)
 - ▲ Problem determination procedures
 - ▲ Advanced Diagnostics Diskette
 - ▲ Wrap connector
- CCITT V.35 Interface Cable (#6061)

The Realtime Interface Co-Processor has been designed for use in industrial applications of the IBM Industrial Computers and IBM Personal Computers. The Co-Processor is compatible with the 5531, 7531, 7532, 5160, and 5170 computer systems. The 5531 Industrial Computer and 5160 Personal Computer are based on the Intel(1) 8088 microprocessor. The 7531 and 7532 Industrial Computers and 5170 Personal Computer are based on the Intel(1) 80286 microprocessor.

The Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are two independent serial ports that operate at speeds up to 64K bps using direct memory access. One port can operate at 64K bps full duplex, while the second is operated at a maximum of 19.2K bps full duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the Co-Processor is designed to accept two optional interface boards or user developed custom Interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the Interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20ma Current Loop Interface Board
- CCITT V.35 Interface Board.

A maximum of two Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be found in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports

and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit mode on the 5531 and 5160 and in 8-bit or 16-bit mode on the 7531, 7532 and 5170.

The Realtime Interface Co-Processor will be available in two memory capacities, 128KB and 512KB, and will be shipped with either 5.25-inch or 3.5-inch program media.

- IBM Realtime Interface Co-Processor with 128KB of memory and 5.25-inch program media (#6050)
- IBM Realtime Interface Co-Processor with 128KB of memory and 3.5-inch program media (#6165)
- IBM Realtime Interface Co-Processor with 512KB of memory and 5.25-inch program media (#6160)
- IBM Realtime Interface Co-Processor with 512KB of memory and 3.5-inch program media (#6166)

All Realtime Interface Co-Processor features are functionally equivalent. Features #6050 and #6165 are shipped with 128KB of memory, upgradeable to 256KB, and features #6160 and #6166 are shipped with 512KB of memory, upgradeable to 1024KB. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128KB Memory Expansion Option (#6055) (Can only be used with features #6050 and #6165)
- 512KB Memory Expansion Option (#6161) (can only be used with features #6160 and #6166)

Detailed technical information on the Realtime Interface Co-Processor is provided in the optional Realtime Interface Co-Processor Technical Reference (#6058).

Realtime Control Program

The Realtime Control Program is microcode for the Realtime Interface Co-Processor. It is included with the Co-processor feature and is shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The Realtime Control Program microcode provides a realtime, multi-tasking operational environment for supporting user applications running on the Realtime Interface Co-Processor. The Realtime Control Program microcode is loaded from the system unit memory to the Realtime Interface Co-Processor memory. Once loaded, the Realtime Control Program microcode initializes itself and the Realtime Interface Co-Processor. It then signals the system unit processor that it is loaded and ready.

The Realtime Control Program microcode supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the Realtime Control Program microcode may communicate with another task running under the control program or with an application program running in the system unit.

The Realtime Control Program microcode provides support for interfacing IBM Industrial Computer or Personal Computer applications to the Realtime Control Program microcode and uses the IBM PC Macro Assembler as the program-preparation facility.

The Realtime Control Program microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 256 software timers with increments ranging from 5 ms to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Intertask communications is accomplished by the wait/post mechanism. Data may be passed between tasks by user queues.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Realtime Interface Co-Processor upon failure. It will also switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the Realtime Control Program microcode is provided in the optional Realtime Interface Co-Processor Technical Reference (#6058).

The Realtime Interface Co-Processor can coexist with the following IBM Industrial and Personal Computer adapters:

- 64/256KB Memory Expansion Option (#1013)
- 128KB Memory Expansion (#0209)
- 512KB Memory Expansion (#0203)
- PC Network Adapter (#0213)
- Enhanced Color Graphics Adapter (#1200)
- Combination Adapter II (#6020)
- Binary Synchronous Communications Adapter (#1204)
- SDLC Communications Adapter (#1205)
- Asynchronous Communications Adapter (#2074)
- Personal Computer Cluster Adapter (#1206)
- Data Acquisition and Control Adapter (#1502)
- General Purpose Interface Bus Adapter (#1503)
- Color/Graphics Monitor Adapter (#4910)
- Serial/Parallel Adapter (#0215)
- 10MB Fixed Disk Drive/Adapter Kit (#6018)
- Printer Adapter (#5200)
- Monochrome Display and Printer Adapter (#4900)
- 3278/79 Emulation Adapter (#2507)
- XT/370 Option Kit (#3891)
- Token-Ring Network PC Adapter (#9100)
- Voice Communications Adapter (#4839)
- Game Control Adapter (#1300)
- Enhanced Display Station Emulation Adapter (#2879)
- 5253 Emulation Installation Convenience kit (#2882)
- 5250 Emulation Convenience Kit (#2886)
- AT/370 Option Kit (#6115)
- XT/370 Option Kit (#1509)

Publications

The Realtime Interface Co-Processor will be shipped with one manual:

- "IBM Realtime Interface Co-Processor Guide to Operations"

The Guide to Operations covers the Realtime Interface Co-Processor and the optional Interface Boards and cables. The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Realtime Interface Co-Processor, optional Interface Boards, and cables. This publication is intended for anyone who will be installing, using, or programming the Realtime Interface Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available from Mechanicsburg.

The following manuals are available for purchase:

- "IBM Realtime Interface Co-Processor Technical Reference" (#6058)

The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Also included is detailed technical information on Interface Board design. It describes the interface between the Realtime Interface Co-Processor and the pluggable Interface Board. Detailed information on the programmer interfaces to the Realtime Control Program microcode is included.

The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Realtime Interface Co-Processor, Realtime Control Program microcode, optional Interface Boards and cables.

- "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (#6059)

The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Realtime Interface Co-Processor. This manual contains a "Problem Isolation"

section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and a 15-pin wrap-connector for use when running Co-Processor diagnostics.

Limitations

Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed in the "Compatibility" section of this document are not supported.

The Realtime Interface Co-Processor is not designed to run DOS applications but is intended for industrial applications written to interface with the Realtime Control Program microcode.

In most system configurations, one Realtime Interface Co-Processor can be installed in the 5531 and 5160 computers, and up to three can be installed in the 7531, 7532, and 5170 Computers. For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 80286-based IBM Industrial and Personal computers prohibits an 8-bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a 16-bit adapter (Realtime Interface Co-Processor) within the same region.

See the "IBM Realtime Interface Co-Processor Technical Reference" for complete details.

Prerequisites

The Realtime Interface Co-Processor must be installed in one of the following systems:

- 5531 Industrial Computer
- 7531 Industrial Computer
- 7532 Industrial Computer
- 5160 Personal Computer
- 5170 Personal Computer

Customer Setup (CSU): The Realtime Interface Co-Processor and all options are customer setup (CSU). CSU allowance is one (1) day. Detailed setup instructions are included with each co-processor card. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

Special Features

EIA RS-232-C/CCITT V.24 Interface Board (#6051): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.

EIA RS-422-A Interface Board (#6064): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4000 ft, however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

CCITT V.35 Interface Board (#6053): Adapts one of the Co-Processor's serial ports for compatibility with CCITT V.35 interfaces.

20ma Current Loop Interface Board (#6066): Adapts one of the Co-Processor's serial ports for compatibility with 20ma interfaces. The current loop Interface Board also has the capability to provide the 20ma current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment. See the IBM Realtime Interface Co-Processor Technical Reference for details.

Realtime Interface Co-Processor 128KB Memory Expansion (#6055): Expands the Realtime Interface Co-Processor (#6050 and #6165) memory from 128KB to 256KB. Only one 128KB Memory Expansion Option may be installed.

Realtime Interface Co-Processor 512KB Memory Expansion (#6161): Expands the Realtime Interface Co-Processor (#6160 and #6166) memory from 512KB to 1024KB. Only one 512KB Memory Expansion Option may be installed.

EIA RS-232-C Direct Attach Interface Cable Option (#6056): Allows the user to connect one port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

EIA RS-232-C Modem Attach Interface Cable (#6057): Allows the user to connect one port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

CCITT V.35 Interface Cable (#6061): Allows the user to connect one port of the Realtime Interface Co-Processor to a CCITT V.35 modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the CCITT V.35 Interface Board (#6053) is installed.

Specified Operating Environment

- Intel(1) 80186 Microprocessor
- 7.37 MHz clock speed
- 20-bit addressing
- 16-bit data path
- 128KB or 512KB Dynamic RAM
- 16KB ROM

Operating Environment

● Electrical

- Operating voltages:

- ▲ +5V DC
- ▲ +12V DC
- ▲ -12V DC
- ▲ -5V DC

- Current requirements

- ▲ Realtime Interface Co-Processor
 - △ +5V DC at 2.1a
- ▲ RS-232-C/CCITT V.24 Interface Board
 - △ +5V DC at 80ma
 - △ +12V DC at 35ma
 - △ -12V DC at 22ma
- ▲ RS-422-A Interface Board
 - △ +5V DC at 120ma
- ▲ 20ma Current Loop Interface Board

- △ +5V DC at 35ma
- △ +12V DC at 52ma
- △ -12V DC at 45ma

▲ CCITT V.35 Interface Board

- △ +5V DC at 150ma
- △ -5V DC at 70ma
- △ +12V DC at 15ma
- △ -12V DC at 15ma

● FCC Class A

Installation of the Realtime Interface Co-Processor changes the FCC rating of the 5160 and 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. See the "IBM Realtime Interface Co-Processor Guide To Operations" for the FCC Statement.

Hardware Requirements

One of the following IBM system units is required for operation of the Realtime Interface Co-Processor.

- 5531 Industrial Computer Mdls 011 and 021
- 7531 Industrial Computer Mdl 041
- 7532 Industrial Computer Mdl 041
- 5160 Personal Computer Mdls 087, 068, 078, 267, 268, 277, 278, 088, and 089
- 5170 Personal Computer Mdls 068, 099, 239, 319, and 339

Software Requirements

The IBM Personal Computer Disk Operating System (DOS), version 2.1, 3.0, 3.1, or 3.2 is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- IBM Realtime Interface Co-Processor Technical Reference (#6058)
- Realtime Control Program DOS Support (Program No. 5669-177)
- Realtime Interface Co-Processor C Language Support (Program No. 5656-094)
- Realtime Interface Co-Processor Developer's Kit (Program No. 5669-176)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

See IBM.

5669-061 - RT PERSONAL COMPUTER ADVANCED INTERACTIVE EXECUTIVE OPERATING SYSTEM (AIX)

(P/N 55X8994)

PURPOSE

The IBM RT PC Advanced Interactive Executive (AIX)* Operating System is a multi-user, multi-tasking, virtual memory operating system. The AIX Operating System can operate as a single-user system or as a multi-user system with up to eight concurrent terminal users. A multiple virtual terminal interface allows task switching. The AIX Operating System provides a broad range of capabilities, including a user interface with menus and a command bar, menu driven installation and configuration procedures, a DOS shell, and upward compatible support for a UNIX** System V environment***.

* AIX is a trademark of International Business Machines Corporation

** Trademark of AT&T Bell Laboratories

*** The UNIX component of the AIX Operating System was developed by IBM and INTERACTIVE Systems Corporation. The AIX Operating System is based on INTERACTIVE's IN/ix**** which is based in turn on UNIX System V, as licensed by AT&T Bell Laboratories.

**** Registered trademark of INTERACTIVE Systems Corporation.

HIGHLIGHTS

- A Virtual Resource Manager that utilizes the IBM RT PC microprocessor and memory management capabilities to provide:
 - Demand-paged virtual memory management
 - Device independent Input/Output
 - Controlled direct access to high function display devices
 - Multiple virtual terminals
 - User extendable real-time interrupt handling
- Menu-driven installation and configuration procedures to simplify system installation and assist in tailoring the system to support various devices.
- IEEE Floating Point support (ANSI/IEEE Std 754-1985).
- Provides support for attachment of ASCII workstations
 - The IBM 3161 ASCII Display Station
 - The IBM 3163 ASCII Display Station (in 3161 Mode)
 - The IBM PC, PC/XT, IBM Portable PC, and the IBM PC/AT, via emulation mode
 - ASCII terminals that adhere to ANSI 3.64 protocol as implemented by DEC(TM) (Trademark of Digital Equipment Corporation) VT100 and DEC VT220 or equivalent
 - A documented system interface allows programming support for additional ASCII terminals
- Support for a variety of IBM RT PC printers and plotters
- Ability to operate with any of the following user interfaces:
 - Usability Services, which provides menus, command bars, and windows designed for ease of learning and use.
 - UNIX (Bourne shell)
 - DOS shell, providing a DOS user interface with PC DOS commands
 - TEN/PLUS(TM) (Registered trademark of INTERACTIVE Systems Corporation), a user interface consisting of the File Manager and History Display integrated with the INed(TM) (Trademark of Interactive Systems Corporation), editor
 - C shell

- Ability to transfer ASCII files between IBM PC DOS file systems and AIX file systems, and to access interactively IBM PC DOS files from the DOS Services shell
- Programming interface support to access PC DOS files, on fixed disks or diskettes, from a program on the AIX Operating System
- Program development support
 - Assembler and C compiler
 - Source code control system (SCCS)
 - Symbolic debugger
 - Program updating capability with history control to manage change levels of installed software.
 - Error logging, tracing, and problem determination capabilities
 - UNIX tools and utilities
 - Vi editor
- INed, a full-screen text editor
- Asynchronous terminal communication/emulation
- Programmer interface to facilities of the PC Network
- Upward compatible support for a UNIX System V environment including:
 - System V Release 1 base
 - Selected UNIX System V Release 2 and Berkeley Software Distribution (Developed at the Electrical Engineering and Computer Sciences Department at the Berkeley Campus of the University of California under the auspices of the Regents of the University of California.) 4.2 extensions

DESCRIPTION

The IBM RT PC Advanced Interactive Executive (AIX) Operating System is a multi-user, multi-tasking, virtual memory operating system.

The Virtual Resource Manager (VRM) portion of the AIX Operating System provides a high-level multi-tasking machine interface. It provides hardware-independent device interfaces that allow the hardware device configuration to be modified without affecting the operating system or application software. Logical disk support (minidisks) improves system management capability and allows both DOS and AIX formatted files to exist on the same fixed disk. The support for the main system displays includes multiple virtual terminal support. This allows a user to be running multiple tasks, at the same time, from a system attached keyboard/display and switch between the tasks. All tasks continue executing while one task has control of the keyboard and display. Each task can be written as if it had exclusive control of one or more displays. Programmers can use the interrupt handling capabilities of the VRM to write device drivers to support real time processing applications.

The AIX Operating System contains a number of functions for display and console support. Character mode provides a device-independent interface. Monitored mode provides direct access to the display. A pointing device (mouse) and sound are supported. Window-management routines allow a user to open multiple full-screen windows and "hot key" between them. Additional enhancements support color functions and extended graphics.

The AIX Operating System, in conjunction with specialized hardware, provides virtual memory support. The 40-bit virtual memory addressability is divided into segments of 256M bytes each, with storage protection provided for each 2K-byte page. Virtual memory allows the operating system and application programs to be written

and executed without being limited to the size of the actual physical memory that is installed on the executing system. Programs and user data-file segments may be "mapped" into memory segments, allowing the file data to be accessed as memory.

- I The UNIX shell is a command interpreter that serves as an interface between the user and the operating system. It reads the user's command, calls the corresponding program, and executes it. The command may be a single AIX command, multiple commands (a procedure), or a program. This AIX shell will be familiar to UNIX users.

The DOS shell provides a DOS-like user interface to the AIX Operating System as well as access to both DOS and AIX files. Most internal DOS 3.0 commands are supported. The DOS shell can interactively read and write DOS formatted diskettes. Commands available in the DOS shell convert ASCII files between DOS and AIX formats. The DOS shell will be familiar to users of DOS on the IBM PC.

The installation of the AIX Operating System is accomplished through a menu-driven user interface that assists the user in allocating disk space and setting other system parameters at installation time. Most system defaults are modified automatically in accordance with the hardware configuration of the system, or the user may specify other parameters to tailor the system for unique requirements. Devices, adapters, and minidisks can be added by using AIX commands that prompt the user for any required input. Configuration files are automatically updated, file systems and queues created, and the system kernel rebuilt, if necessary. Thus, most of the information required for system installation is included in the AIX Operating System installation tools. Also included in the AIX Operating System are facilities for a uniform method of installing other IBM RT PC system and application programs.

The AIX Operating System includes an enhanced print command to facilitate spool queue handling, and a command to facilitate adding new users to the system. Also provided is the Connect(TM) (Trademark of INTERACTIVE Systems Corporation) command which allows concurrent work on an IBM RT PC and another UNIX system, such as PC/IX, IX/370, or another IBM RT PC, as well as non-UNIX systems, via remote connection.

The AIX Operating System contains a software emulation of the floating-point functions (ANSI/IEEE Std. 754-1985). The optional IBM RT PC Floating-Point Accelerator may be installed for improved performance of programs that use floating-point routines. Programs may be compiled to use the IBM RT PC Floating-Point Accelerator if it is available at execution time, or if it is not available, to use software emulation. Alternatively, the program may be compiled so that the Floating-Point Accelerator is required for execution, thus providing additional improved performance. This provides the user the option of making the code portable or optimizing it for performance.

Printers are supported via an extended PC ASCII print data stream. In addition, passthrough mode may be used by those applications that require the ability to use the unique features of a specified printer. The AIX Operating System provides a common application interface to the following printers:

- IBM 4201 Proprinter
- IBM 5201 Quietwriter (Mdl's 1 and 2)
- IBM 5152 Graphics Printer (withdrawn from marketing)
- IBM 5182 Color Printer (withdrawn from marketing)

The following plotters are supported via the asynchronous (RS232C) serial ports on the IBM RT PC:

- IBM 6180 Color Plotter
- IBM 7371 Color Plotter
- IBM 7372 Color Plotter
- IBM 7374 Color Plotter
- IBM 7375 Color Plotter (Mdl's 1 and 2)

The AIX Operating System provides support for the following displays:

- IBM 6153 Advanced Monochrome Graphics Display
- IBM 6154 Advanced Color Graphics Display
- IBM 6155 Extended Monochrome Graphics Display

- IBM 5151 PC Display
- IBM 5154 PC Enhanced Color Display
- ASCII workstations listed in "Highlights" section above

The AIX Operating System includes several features designed to support program development on the IBM RT PC. For example, new device drivers may be written in the C language and integrated into the VRM to support new hardware. Programming interfaces have been provided to install and configure application programs and new devices in a uniform manner. The publications are designed to assist programmers, whether or not they have previous experience with UNIX environments. An assembler and a C compiler are shipped with the AIX Operating System.

Within the AIX Operating System, there are numerous problem determination aids. Most hardware errors are automatically logged; these logs may be accessed with the error analysis functions to assist in isolating intermittent problems. Trace functions are provided for additional assistance. A history record is maintained whenever a program is updated to assist in keeping system consistency and program level control.

Functions are provided to apply software updates, test the updates in an application environment, then commit or reject the updates.

OPTIONALLY INSTALLED PROGRAMS

This section describes six programs contained in the AIX Operating System that can be installed optionally.

INed

The INed editor is part of the TEN/PLUS user interface. In addition to the INed editor, the TEN/PLUS user interface consists of the File Manager and the History Display. The INed Editor is the highest function editor shipped with the AIX Operating System. It is a full-screen text editor that allows users to view and edit files. The editor supports multiple concurrently edited files and multiple windowing for a single file or for multiple files. Other functions include: vertical and horizontal scrolling, word wrap, cut and paste, and move/copy capabilities. The editor also allows execution of AIX system commands within an edit session. Editor commands are executed through function key sequences. The INed Editor also provides an enhanced user interface to the INmail/INnet/FTP(TM) (INmail and INnet are trademarks of INTERACTIVE Systems Corporation) program.

Usability Services

Usability Services provides an easy-to-use interface to many of the AIX Operating System functions. A subset of the commands and parameters are supported through a command bar and pop up menus. Window support allows the creation of new windows as well as the ability to view a list of the existing windows and their status. Tools windows provide access to AIX system functions and provide the ability to add new functions. Files windows give access to the AIX directory structure and provide for initiation of commands associated with data files. Finally, the shell windows provide access to the DOS shell or the UNIX shell, for those who prefer direct access to the commands. These features are available to users on any of the supported attached terminals.

On the console terminal, multiple concurrent windows are supported, allowing easy switching among multiple active tasks. Also, on the console terminal, the options on the command bar and menus may be accessed with an optional pointing device (mouse).

Asynchronous Terminal Emulation

This option allows the IBM RT PC to emulate an ASCII display terminal connected to a host computer. It provides a convenient means of establishing the connection through automatic dialing and connection configuration data. After connection, the operator can interact with the remote system and send/receive files via the XMODEM protocol. This may be used to connect with remote private data bases and other IBM RT PC systems.

The menu selection functions include:

- Help

PROGRAM PRODUCTS

- Connect Services
- Directory Services
- Session Parameter Generation
- Operating System Command Interface
- File Send/Receive Commands

Multi-User Services

The AIX Operating System supports up to eight concurrent terminal users. The Multi-User Services option provides the system accounting functions. System usage is recorded for each user. This includes elapsed time for various components of the system as well as space utilization of the disk files. If desired, charges can be generated at the end of each accounting period.

Extended Services

The Extended Services functions are designed to support program development. In addition, there are many miscellaneous functions included in this option.

The Source Code Control System (SCCS) is a collection of programs that manage changes to source and text files. It provides facilities for storing, updating, and retrieving any version of a controlled file, controls updating privileges to a file, and records who made each change, when it was made, and why it was made. SCCS assists software developers during the development, testing, and support of programs. SCCS includes the following features:

- Restore files to a previous stage of development or maintenance
- Storage of the original file and changes made to it, so that common code or text is stored only once
- Protection from unauthorized changes
- Automatic insertion of identifying information into source and object code modules

Extended Services also includes:

- UUCP (UNIX-to-UNIX Copy Program) to move files between UNIX systems
- Commands to execute tasks remotely on another AIX-based system
- UNIX games

Base PC Network Services

The IBM RT PC Base PC Network Services provides basic support for the PC Network Local Area Network. This program provides a programming interface for customer-supplied applications to use the facilities of the PC Network. This programming interface allows the exchange of messages and data across the IBM PC Network with the IBM PC, IBM PC/XT, IBM PC/AT and IBM RT PC.

The following section summarizes some of the features and functions in The IBM RT PC AIX Operating System that are additions to the UNIX System V Release 1 derived base. They are from UNIX System V Release 2, from Berkeley Software Distribution 4.2, by INTERACTIVE Systems Corporation, and by IBM.

UNIX System V Release 2

- Vi full screen editor
- Expanded "curses" screen graphics library and terminfo library
- Enhanced Bourne shell
- Additional commands (e.g., ls, ar, at, batch, pg)

Berkeley Software Distribution 4.2

- Enhanced signals, including five additional signal processing commands
- Multiple concurrent group access support
- File enhancements, including file synchronization and truncation
- C shell and BSD User Interface support

INTERACTIVE Systems Corporation

- Enhanced system performance and virtual paging support

- Improved installation and system configuration procedures
- File system enhancements for an improved backup/restore facility
- Improved terminal port management for enhanced TTY device characteristics
- Generalized queuing system for improved job and print queue management
- I Ned full screen editor for data creation and manipulation
- Connect command to facilitate remote connections

IBM

- A point and select interface via Usability Services
- An IBM PC DOS-like interface via DOS Shell
- DOS File Import/Export facilities
- Extended "curses" library functions
- Window design and management facilities for displays
- Dynamic configuration facilities
- Device independence for printers and displays, via common device drivers
- Generalized spooling support for private or public queues
- Optional software emulation of the hardware floating point adapter
- Multiple interactive session management, initiated via menu or command

CUSTOMER RESPONSIBILITIES

A customer installing IBM RT PC Advanced Interactive Executive Operating System must:

- Have installed at least a minimum machine configuration
- Read and understand the "IBM RT PC Installing and Customizing the AIX Operating System manual" (SV21-8001)

National Language Support

This software product is sensitive to national language character handling. The product should be reviewed relative to the national language requirements of the intended customer before ordering.

The software keyboard mapping table default is the English US keyboard layout. When a national language keyboard is being installed, one of the respective language software keyboard mapping tables can be selected to override the system default. The system will then be powered up using the override mapping table for the system keyboard.

SPECIFIED OPERATING ENVIRONMENT**Hardware Requirements**

The minimum machine requirement is an IBM RT PC with a display (e.g., the IBM RT PC Advanced Color Graphics Display, the IBM RT PC Advanced Monochrome Graphics Display, or the IBM Personal Computer Display).

Optionally, an asynchronous modem can be installed for use with Asynchronous Terminal Emulation, UUCP, or the Connect command.

Program support is provided for asynchronous modems that support the following specifications: EIA RS-232C Standard (dated August 1969) or the CCITT Recommendations V.24/V.28 as published in the report of the CCITT 7th Plenary Assembly (Yellow Book), Geneva, 10-21 November 1980. Program support is also provided for auto-dialer modems that conform to the "AT" command set using asynchronous protocol.

Software Requirements

There are no software prerequisites for the AIX Operating System.

Do not reproduce without written permission

COMPATIBILITY/CONVERSION

Compatibility to UNIX source programs:

Programs written according to the AT&T Bell Laboratories UNIX System V specifications will normally take little, if any, modification to successfully compile and execute on the AIX Operating System. In addition, text files can be exchanged with most other UNIX systems (e.g., PC/IX and IX/370).

SECURITY/INTEGRITY

When users are added to the system they are assigned a User ID and assigned to a group. They may also be assigned a password, which is required at sign-on time. Each group is allowed access to files based on the authorization of the file owner.

A file may be accessed by its owner and by groups (of users). A group may be allowed full access, or the access may be limited based on the file owner's authorization.

User management is responsible for evaluation, selection, and implementation of security features, for administrative procedures, and for appropriate controls in application systems.

For applications in which sensitive data is sent over external communication facilities, user management may wish to pursue the application of cryptography.

PERFORMANCE CONSIDERATIONS

The performance of the AIX Operating System will be affected by the number of users, system configuration, and number and types of programs. Often the performance may be enhanced by doing one or more of the following:

- Increase the amount of memory on the system
- Distribute the data files across multiple hard files
- Locate data files physically close together to minimize file seek time
- If the IBM RT PC Floating-Point Accelerator is installed, compile programs to take advantage of it whenever possible.

DOCUMENTATION

The following publications are shipped with the LPP. Additional copies may be purchased. These publications will be ordered and updated via the System Library Subscription Service (SLSS).

- GC23-0784 IBM RT PC Concepts (P/N 55X8895)
- SV21-8001 IBM RT PC Installing and Customizing the AIX Operating System (P/N 55X8892) includes:
 - SC23-0814 IBM RT PC Bibliography and Master Index (not sold separately)
- SV21-8003 IBM RT PC Usability Services Reference (P/N 6280758) includes:
 - IBM RT PC Exploring Usability Services (not sold separately)
 - IBM RT PC Usability Services Guide (not sold separately)
 - IBM RT PC Usability Services Keyboard Reference Charts (not sold separately)
 - IBM RT PC Usability Services Quick Reference Card (not sold separately)
- SV21-8004 IBM RT PC Using and Managing the AIX Operating System (P/N 6280757)
- SV21-8005 IBM RT PC AIX Operating System Commands Reference (P/N 55X8897)

- SV21-8006 IBM RT PC INed (P/N 6280759)
- SV21-8002 IBM RT PC Messages Reference (P/N 55X8896)
- SV21-8007 IBM RT PC AIX Operating System Communications Guide (P/N 55X8894)

The following publications document functions in the AIX Operating System but are sold separately. These publications will be ordered and updated via the System Library Subscription Service (SLSS) with the exception of the "Virtual Resource Manager Technical Reference" manual. This manual will be updated via Updated Information Service.

- SV21-8013 IBM RT PC Virtual Resource Manager Technical Reference (P/N 55X8936)

This manual is intended for individuals involved in writing programs at the operating system level that require an interface to the Virtual Resource Manager. It defines the VRM routines, explains the use of the VRM debugger, explains how to develop and install code into the VRM and defines the Virtual Machine Interface to the VRM-supplied device drivers. This manual will be updated via the Update Information Service (UIS) for no additional charge.

- SV21-8012 IBM RT PC AIX Operating System DOS Services Reference (P/N 55X8929)

This manual provides reference information about the IBM RT PC AIX Operating System DOS Commands; describes DOS Shell file and directory specifications, search paths, devices, ed (the line editor), standard input and output, and commands. This book also includes information on customizing AIX DOS defaults, differences between the DOS and AIX DOS, and technical information for experienced programmers.

IBM RT PC Using AIX Operating System DOS Services

This manual is a step-by-step guide that provides general information to assist in getting started on the DOS shell and to perform some common tasks. This guide includes general information on using diskettes and fixed disks, using DOS shell function and command-line editing keys, naming, organizing and locating files entering and leaving IBM RT PC, starting and stopping the DOS shell and issuing some frequently used DOS shell commands. This manual is included in the "AIX Operating System DOS Services Reference."

- SV21-8011 IBM RT PC Assembler Language Reference (P/N 55X8930)

This manual discusses the IBM RT PC 032 Microprocessor and its Assembler Language. It describes the syntax and semantics, instructions to the processor (machine instructions), and instructions to the assembler (pseudo-operations). This manual also shows how to link and run Assembler Language programs, including linking to programs written in C language.

- SV21-8008 IBM RT PC C Language Guide and Reference (P/N 55X8931)

This manual contains a guide to writing, compiling, running, and debugging C language programs. A reference section describes C language data structures, operators, expressions, and statements.

- SV21-8009 IBM RT PC AIX Operating System Technical Reference (P/N 55X8933)

This manual describes the system calls and subroutines that a C programmer uses to write programs that interface with the operating system.

- SV21-8010 IBM RT PC AIX Operating System Programming Tools and Interfaces (P/N 55X8932)

This manual provides a general look at programming on the IBM RT PC. It gives details about using the AIX Operating System tools to develop, compile, and debug C language programs. It also gives examples of how to use system calls and library subroutines to create programs. In particular, the us-

age of program interfaces for IBM added functions is described.

- SV21-8037 IBM RT PC AIX Operating System Text Formatting Guide (P/N 55X8935)

The Text Formatting Guide describes the functions and capabilities of NROFF and TROFF text formatters and of other associated text processing programs.

- SV21-8030 IBM RT PC Base PC Network Services (P/N 55X8918)

This manual provides basic support for the PC Network Local Area Network. It documents the interface for

customer-supplied applications to use the facilities of the PC Network.

RPQS ACCEPTED: NO.

TERMS AND CONDITIONS

Program Service: Central Service and two levels of remote service.
-- Installation License Applies: No. -- Warranted: Yes. Media for 90 days, LPP for as long as program service is offered. Basic License: Program License Agreement.

5810 LIMITED DISTANCE MULTIMODEM ENCLOSURE

PURPOSE

The 5810 is a multimodem enclosure for housing up to fifteen 5811-018, 5811-028 or 5812-018 (rackmount) limited distance modems. The 5810 is designed to be mounted in a standard, commercially available, 19-inch electronic equipment rack/cabinet. It provides housing and power for up to fifteen 5811 mdl 18 limited distance modem packs.

MODELS

Model 10 010: Multimodem Enclosure for installation in standard 19-inch electronic equipment cabinets.

Customer Setup (CSU): The 5810 multimodem enclosure is designed to be setup by the customer. This provides the customer with early availability. This also allows relocation of the unit without requiring IBM service personnel assistance.

In countries where Customer Setup is prohibited or impractical, terms and conditions will include CE support for installation. Contact IBM to find out if Customer Setup applies.

HIGHLIGHTS

- The 5810 multimodem enclosure provides housing and power for 5811/12 limited distance modem packs. Fifteen packs can be housed in an enclosure.
- The 5810 has dual power transformers such that in the event of a transformer failure only half of the 15 modems in the enclosure will be affected.
- No cooling fan is required in the cabinet housing the enclosure so long as the convective air in the cabinet is within specified limits. This is made possible by the lower power dissipation of the CMOS technology in the 5811/12 modems.
- Each modem mounted in the 5810 enclosure presents its own RS-232-C/V.24 connector for attachment of DTE cables.
- The communication line interfaces from all 15 modem sockets gathered in the rear panel of the enclosure. Thus, telecommunication line attachment to enclosure housed modems is by means of two (25 pair) cables connected to the Multimodem Enclosure by two 50-pin AMPHENOL type connectors. One 50-pin connector and cable is used for the TRANSMIT pairs; the other is used for RECEIVE pairs. See "Attachment to Facilities".
- 14 dummy packs are shipped with the enclosure.

COMMUNICATION FACILITIES

Attachment to Facilities: The communication line interface from all 15 modem packs in the 5810 Modem Enclosure are cabled within the enclosure to two 50-pin connectors on the rear panel of the enclosure. Thus, telecommunication line attachment to enclosure housed modems is by means of two (25 pair) cables connected to the Modem Enclosure by two 50-pin AMPHENOL type connectors. One 50-pin connector and cable is used for RECEIVE pairs; the other is used for TRANSMIT pairs. These cables must generally be customized for each installation; their design depends upon cable length and physical termination method at the telecommunication link interface. Customers should allow adequate lead time for planning and procurement of these cables from external sources.

Related Equipment: The 5811/12 Modems housed in the 5810 Multimodem enclosure operate with IBM communication products capa-

ble of 2400, 4800, 7200, 9600, 14400 or 19200 bps synchronous operation or at specific speeds from 45.5 bps to 19200 asynchronous operation. (Different models have different levels of function. See sales pages specific to the model and the M2700 pages). The 5811/12 modems must communicate with other 5811/12 modems. By use of a special tailing cable the 5811 modems may serve as tailed modems to 3865 mdl 1 modems equipped with Data Multiplexing (#3260) or to other conventional long-haul modems.

The stand-alone 5811 mdl 020 can be converted by the customer to a rackmount 5811 mdl 028 and installed in a 5810 enclosure. The procedure is documented in the "5810 Enclosure, 5811 and 5812 Modems, Setup, Problem Analysis and Resolution Guide", GA33-0083. This procedure can be reversed and is also documented in the same guide.

The interconnecting cables between the business machines and the modems must be supplied by the business machines.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "5811/12 Modems Description and Planning Guide", (GA33-0081).

The customer is also responsible for:

- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.
- Private line (non-switched) channels -- arranging for the telecommunications service supplier to provide baseband data channels. Also, arranging for the installation of the appropriate receptacles described in "Attachment to Facilities".
- Ensuring the availability of the two interconnection cables required between the 5810 Multimodem Enclosure and the telecommunications lines.
- Ensuring the availability of the interconnection cables between the business machines and the modems because they must be supplied by the business machines.
- Unpacking and placing of the 5810. Physical setup, and connection of cables at setup time. During the physical setup, the position of the configuration switches located on the rear panel of the modems must be reviewed to ensure compatibility with the actual application. (Example: Point-to-point primary or secondary; multipoint control or tributary.) Details are in the "IBM 5810 Enclosure, 5811 and 5812 Modems, Set-up, Problem Analysis and Resolution Manual", GA33-0083, shipped with each 5810 Enclosure and Rackmount Modem.
- Performing Problem Analysis and Resolution.

Bibliography: See "KWIC Index", G320-1621, or specific systems bibliography.

SPECIFY

No specify codes are required since all country specifics (transmit levels, documentation language, front panel language, primary voltage, and power plug configuration) are identified with a 3-digit country code and predetermined at the factory.

- (Japan only > Power (100 VAC, 1-phase, 2-wire, 50/60 Hz): 1.8m (5.5 ft) power cable (no specify code required). <)
- Language Groups: The 3-digit country code is used to select the language which meets the requirements of the country as follows:

English
(Japan only > Japanese <)

IBM IBM Canada Ltd.

MACHINES

M 5810.2
JUL 86
MAJOR REVISION

SPECIAL FEATURES (NONE)

Country
Japan

In-Plant
Y

Out-Plant
N

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

Ordering Instructions: Order via standard AAS ordering.

5811 LIMITED DISTANCE MODEM

THERE IS MORE THAN 1 TEXT VERSION FOR THIS DOCUMENT

PURPOSE

The 5811 is a 2400, 4800, 9600, or 19,200 bps baseband modem used to provide communications products with a means for transmitting synchronous data over baseband, point-to-point or multipoint channels for limited distances. The distance is dependent on speed and size of the wire used for the line. A typical range is 7.5 miles for 9600 bps transmission over AWG 22 (0.6mm) wire.

This advanced microprocessor-based modem has automatic line equalization and incorporates extensive diagnostic capabilities. Transmission speed, link configuration, etc., are set by operator accessible setup switches on the rear panel.

MODELS 10, 18

Model 10 010 (No Longer Available): A stand-alone unit which operates in half-duplex or duplex mode over 4-wire nonswitched duplex facilities having metallic continuity. Operates in point-to-point, multipoint control, or multipoint tributary mode.

Model 18 018 (No Longer Available): A rackmount unit with the same characteristics as Model 10. Model 18 requires a 5810 Modem Enclosure.

The 5812-010, 5812-018, 5811-010, 5811-018, 5811-020, 5811-028, can all be configured via the user option switches to be operationally compatible with one another at the functional compatibility of the lesser model.

Customer Setup (CSU): The 5811 is designed to be setup by the customer. This provides the customer with early availability. This also allows relocation of the unit without requiring IBM service personnel assistance. Customer accessible setup switches are provided on the rear panel to enhance installability of the modem. A modem may be configured for point-to-point, multipoint control or multipoint tributary operation with the setup switches.

Note: Some changes of the setup switches may require SYSGEN changes in the program support. In countries where Customer Setup is impractical, terms and conditions will include CE support for installation. Contact IBM to find out if Customer Setup applies.

HIGHLIGHTS

- Data Rate: 2400, 4800, 9600 and 19,200 bps
- Configuration: Selectable by user option switches:
 - Control/Tributary
 - Point-to-point/Multipoint
 - Internal/External clock
 - Receive/Transmit impedances
 - Data Rate
 - Receive clock wrap
- Automatic and Adaptive Equalization: Equalization is automatically performed by the modem and continues to adapt while in data mode.
- Operator Panel with operational status indicators and data quality (Good/Poor) indications
- Extensive manual test facilities
- Selectable Receive/Transmit impedances
- Mdl 10 has an external direct-plug power transformer with a 2.0m (6.5 ft) power cable.

DESCRIPTION

- Modem provides its own clocking or will accept DTE (external) clocking.

Manual Tests: Manual tests can be executed from the modem operator panel. These tests include:

- Local Self Test/Local Self Test with Wrap Plug
 - The Local Self Test tests the modem while isolating it from its environment.
 - The Local Self Test with Wrap Plug will test the modem and the EIA interface.
 - Both tests can be run on a multipoint tributary modem without interfering with the normal operation of the rest of the other stations on the multipoint link.
 - They check the modem operation by first wrapping a test pattern from the transmit section to the receive section of the modem and then checking for errors (the telecommunications line is still connected to the nominal impedance).
- Local Loopback Test
 - The main purpose of the Local Loopback Test is to verify the DTE interface.
 - The test can be run on a multipoint tributary modem without interfering with the normal operation of the rest of the multipoint link.
 - This is either a manual or an automatic test. It must be run with the associated DTE which sends a test pattern to the modem, where it is wrapped back to the DTE for error checking. (The telecommunications line is still connected to the nominal impedance.)
- Loop Transmit Test
 - The Loop Transmit Test enables the telecommunications line and the remote modem to be checked from the control/primary modem without any remote operator. It is not allowed from the tributary/secondary modem.
 - The control/primary modem transmits a test pattern over the data link to the remote modem. The remote modem wraps the received test pattern back to the control/primary modem, where it is compared against the pattern transmitted. For this test, DTEs are not required at either location.
- Remote Loopback Test
 - The Remote Loopback Test has the same purpose as the Loop Transmit Test, except that it is the DTE which generates the test pattern and compares it with the pattern received.
 - The test enables the control/primary DTE-to-modem interface, the control/primary modem operation, the telecommunication line and the remote modem operation to be checked.
 - The test can be run only from point-to-point primary modems or multipoint control modems.
 - For this test, an attached DTE than can transmit and receive a data test pattern is required at the control/primary modem location. A DTE is not required at the remote modem location.
- Lamp Test/Data Rate Indication

- When pushbutton number 6 is pushed, it initiates a lamp test for three seconds.
- If this pushbutton is held more than three seconds, the data rate is displayed on four operator panel lamps.

Maximum Transmission Distances: The following table shows the maximum transmission distances for point-to-point links for various speed versus wire gauge size combinations which may be used.

For multipoint links having a remote star configuration, the main line transmission distance may be the same as that shown for point-to-point links. For multipoint links having a distributed configuration, the main line transmission distance is limited to half that shown for point-to-point links. In either case, the stub length is limited to 200m (656.2 ft). Stub length is the distance between the tributary modem and the point where it attaches to the main line.

K bps	Wire Gauge (AWG) Unloaded			
	0.8mm (#20)		0.6mm (#22)	
	km	mi	km	mi
2.4	24	15	17	10.5
4.8	24	15	17	10.5
9.6	18	11	12	7.5
19.2	17	10.5	10	6

K bps	Wire Gauge (AWG) Unloaded			
	0.5mm (#24)		0.4mm (#26)	
	km	mi	km	mi
2.4	14	8.7	10	6.2
4.8	14	8.7	10	6.2
9.6	10	6.2	7	4
19.2	8	5	5.6	3.5

The 5811 can operate on the IBM cabling system using the AWG 22 (0.6mm) wire of that cabling system. Thus the AWG 22 (0.6mm) column of the above table is applicable when using the IBM cabling system for interconnection of 5811 modems. However, when interconnecting more than two 5811 modems via the IBM cabling system, the rules for multipoint links, given above the table, still apply.

On-Site CPAR Assistance: If a customer desires assistance to perform Customer Problem Analysis and Resolution (CPAR) the customer calls the Marketing Representative who will arrange for IBM on-site assistance. IBM will assist the customer on-site in performing CPAR procedures using the documentation available to the customer. On-site assistance is provided on a per-call basis at the applicable hourly rates and minimum charges. CPAR on-site assistance will be provided only to those customers that are under warranty or covered by a maintenance agreement contract.

Publications: See "KWIC Index", G320-1621, or specific systems bibliography.

COMMUNICATION FACILITIES

Attachment to Facilities: Attachment of a 5811 mdl 10 Standalone Modem to either In-plant or Out-plant lines will be by a cable supplied with the modem. Attachment to PTT facilities in countries where In-plant use only is specified is not allowed.

For attachment of 5811 mdl 18 Rackmount Modems to telecommunication facilities, see "Attachment to Facilities" in the M5810 pages.

Related Equipment: The 5811 Modem operates with IBM communication products capable of 2400, 4800, 9600, or 19,200 bps operation.

See M2700 pages. The 5811 Modem must communicate with another 5811 modem. By use of a special tailing cable the 5811 modem may serve as a tailed modem to a 3865 mdl 1 modem equipped with Data Multiplexing (#3260) or to other conventional long haul modems.

The interconnecting cable between the business machine and the modem must be supplied by the business machine.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "Planning and Site Preparation Guide" (GA33-0033). The customer is also responsible for:

- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.
- Private line (nonswitched) channel -- arranging for the telecommunications service supplier to provide a baseband data channel. Also, arranging for the installation of the appropriate termination described in "Attachment to Facilities".
- Ensuring the availability of the interconnecting cable between the business machine and the modem because it must be supplied by the business machine.
- Ensuring the availability of the interconnection cable between the 5810 Modem Enclosure (in the case of mdl 18 Rackmount Modems) and the telecommunication lines.
- Unpacking and placing of the 5811. Physical setup, and connection of cables at setup time. During the physical setup, the position of the configuration switches located on the rear panel must be reviewed to ensure compatibility with the actual application. (Example: Point-to-point primary or secondary; multipoint control or tributary).

Details are in "IBM 5811-10 Set-Up, Problem Analysis, and Resolution", GA33-0049, shipped with each stand-alone modem or in "IBM 5811-18, Set-Up, Problem Analysis and Resolution", GA33-0050, shipped with the 5810 Modem Enclosure.

- Performing problem analysis and resolution.

SPECIFY

No specify codes are required since all country specifics (transmit levels, documentation language, front panel language, primary voltage, and power plug configuration) are identified with a 3-digit country code and predetermined at the factory.

- (Japan only) Power (100V AC, 1-phase, 2-wire, 50/60 Hz): 2.0m (6.5 ft) power cable, direct plug-in transformer, non-locking plug for model 10 only. Model 18 receives its power from the 5810 Modem Enclosure. (No specify code required.)
- Language Groups: The 3-digit country code is used to select the language which meets the requirements of the country as follows:

English

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

These items are purchase-only and must be ordered separately for the modem.

Order the appropriate part number via Parts and Supplies Requisition.

Telecommunications Interconnect Cable (P/N 6089006): A 7.5m (25 ft.) telecommunications interconnect cable suitable for attaching a 5811 mdl 10 stand-alone modem to the termination point of a telecommunications line. The modem end has a 9-pin type D sub-miniature connector to mate with the modem. The line end has four spade lugs for attaching to a terminal block.

Telecommunications Interconnect Cable (P/N 6339098): A 2.44m (8 ft.) telecommunications interconnect cable suitable for attaching a 5812 mdl 10 or 5811 mdl 020 stand-alone modem to the IBM Cabling System. The modem end has a 9-pin type D sub-miniature connector to mate with the modem. The line end has an IBM Cabling System connector.

Tail Circuit Attachment (P/N 8547438): Allows a 5811 modem to attach, as a tailed modem, to a conventional longhaul modem or to another 5812/11 limited distance modem. For example, this accessory may be used to attach a 5811 modem to a 3865 mdl 1 modem equipped with Data Multiplexing (#3260). Permits an extension of a network via a separate set of modems and a separate communications link. The 5811 must be in multipoint control mode only and set for external clocking. When so connected, LPDA support is unavailable on any section of the cascaded link and the line must be sysgened LPDA = NO.

SUPPLIES (NONE)

Ordering Instructions: Order via standard ordering.

5811 LIMITED DISTANCE MODEM MDLS 20, 28

PURPOSE

A 2400, 4800, 7200, 9600, 14,400 or 19,200 bps synchronous, or 45.5, 50, 75, 134.5, 300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 14,400 or 19,200 bps asynchronous bits/s point-to-point or multipoint, baseband modem used to provide communications products with a means for transmitting synchronous/asynchronous data over baseband channels for limited distances. The distance is dependent on speed and size of the wire used for the line. A typical range is 7.5 miles for 9600 bps transmission over no. 22 AWG (0.6 mm) wire. This advanced microprocessor-based modem has automatic line equalization and incorporates extensive diagnostic capabilities. Transmission speed, link configuration, etc. are set by operator accessible set-up switches on the rear panel. 4-wire/2-wire and transmit level options are customer selectable by modem card jumpers.

MODELS 20, 28

Model 20 020: A stand-alone unit which operates in half-duplex over 4-wire or 2-wire, or duplex mode over 4-wire non-switched duplex facilities having metallic continuity. Operates in synchronous point-to-point, multipoint control, or multipoint tributary mode, or asynchronous point-to-point. 2-wire operation must also be point-to-point.

Model 28 028: A rackmount unit with the same characteristics as Model 20. Model 28 requires an 5810 Modem Enclosure.

Customer Setup (CSU): The 5811 is designed to be set-up by the customer. This provides the customer with early availability. This also allows relocation of the unit without requiring IBM service personnel assistance. Customer accessible setup switches are provided on the rear panel to enhance installability of the modem. A modem may be configured for point-to-point, multipoint control or multipoint tributary operation with the setup switches.

Note: Some changes of the setup switches may require SYSGEN changes in the program support. In countries where Customer Setup is prohibited or impractical, terms and conditions will include CE support for installation. Contact IBM to find out if Customer Setup applies.

Prerequisites: See "Telecommunications Systems" in the GI section.

The 5812-010, 5812-018, 5811-010, 5811-018, 5811-020, 5811-028, can all be configured via the user option switches to be operationally compatible with one another at the functional compatibility of the lesser model.

HIGHLIGHTS

- Data Rate: 2400, 4800, 7200, 9600, 14,400 and 19,200 bps
- Synchronous/Asynchronous operation.
- Half/Full duplex.
- Stand-alone to Rack-mount convertibility.
- Configuration: Selectable by user option switches:
 - Control/Tributary
 - Point-to-point/Multipoint
 - Internal/External clock
 - Receive/Transmit impedances
 - Data Rate
 - Receive clock wrap
 - Anti-streaming feature
 - RTS/RFS short/long delay

- 4-wire/2-wire and transmit 4220 level options are customer selectable by modem card jumpers.
- Automatic and Adaptive Equalization: Equalization is automatically performed by the modem and continues to adapt while in data mode.
- Operator Panel with operational status indicators.
- Extensive manual test facilities
- Selectable Receive/Transmit impedances
- Model 20 has an external direct-plug power transformer with a 2.0m (6.5 ft) power cable.
- Modem provides its own clocking or will accept DTE (external) clocking.

Manual tests can be executed from the modem operator panel. These tests include:

- Local Self Test/Local Self Test with Wrap Plug
 - The Local Self Test tests the modem while isolating it from its environment.
 - The Local Self Test with Wrap Plug will test the modem and the EIA interface.
 - Both tests can be run on a multipoint tributary modem without interfering with the normal operation of the other stations on the multipoint link.
 - Both tests check the modem operation by first wrapping a test pattern from the transmit section to the receive section of the modem and then checking for errors (the telecommunications line is still connected to the nominal impedance).
- Local Loopback Test
 - The main purpose of the Local Loopback Test is to verify the DTE interface.
 - The test can be run on a multipoint tributary modem without interfering with the normal operation of the rest of the multipoint link.
 - This is either a manual or an automatic test. It must be run with the associated DTE which sends a test pattern to the modem, where it is wrapped back to the DTE for error checking. (the telecommunication line is still connected to the nominal impedance)
- Loop Transmit Test (4 Wires)
 - The Loop Transmit Test enables the telecommunications line and the remote modem to be checked from the control/primary modem without any remote operator. It is not allowed from the tributary/secondary modem.
 - The control/primary modem transmits a test pattern over the data link to the remote modem. The remote modem wraps the received test pattern back to the control/primary modem, where it is compared against the pattern transmitted. For this test, DTEs are not required at either location.
- Remote Loopback Test (4 Wires)
 - The Remote Loopback Test has the same purpose as the Loop Transmit Test, except that it is the DTE which generates the test pattern and compares it with the pattern received. This allows for inclusion of the EIA interface in the test procedure.
 - The test enables the control/primary DTE-to-modem interface, the control/primary modem operation, the telecommunication line and the remote modem operation to be checked.
 - The test can be run only from point-to-point primary modems or multipoint control modems.
 - For this test, an attached DTE that can transmit and receive a data test pattern is required at the

control/primary modem location. A DTE is not required at the remote modem location.
- This test can also be automatic, i.e. issued by a DTE with appropriate hardware and software support.

● Transmit/Receive Test (2 Wires)

- This test allows the primary modem to check both the telecommunication line and the remote modem without remote operator involvement. It is only available in point-to-point link (2 wires, half duplex).
- The primary modem sends an SDLC message to the secondary modem and checks for response after which a test pattern is transmitted to the secondary. The secondary modem informs the primary of any error detected during this test.

● Lamp Test/Data Rate Indication

- When pushbutton number 6 is pushed and held for two seconds or less all lamps are lit.
- If this pushbutton is held more than two seconds, the data rate is displayed on four operator panel lamps.

Base Band lines are defined as:

- Metallic continuity lines.
- 4 wires/2 wires twisted pair.

It is recommended that individually twisted pair cable be used. For excessively noisy environments it is necessary for the twisted pairs to be individually shielded.

- A multi-twisted pair cable.

For this case the transmit and receive pairs must be connected by pair. There must be no wire having a high level signal (e.g. dial or ringer pulses) in the same cable.

The following table shows the maximum transmission distances for point-to-point links for various speed versus wire gauge size combinations which may be used.

For multipoint links having a remote star configuration, the main line transmission distance may be the same as that shown for point-to-point links. For multipoint links having a distributed configuration, the main line transmission distance is limited to half that shown for point-to-point links. In either case, the stub length is limited to 200m (656.2 ft). Stub length is the distance between the tributary modem and the point where it attaches to the main line.

	WIRE GAUGE (AWG) UNLOADED			
	0.8mm # 20		0.6mm # 22	
K bps	km	mi	km	mi
N2.4	30	18.7	21	13
BR2.4	24	15	17	10.5
4.8	24	15	17	10.5
7.2	21	13	14	8.7
9.6	18	11.2	12	7.5
14.4	18	11.2	11	6.8
19.2	17	10.6	10	6

	WIRE GAUGE (AWG) UNLOADED			
	0.5mm # 24		0.4mm # 26	
K bps	km	mi	km	mi
N2.4	17	10.6	13	8.1
BR2.4	14	8.7	10	6.2

4.8	14	8.7	10	6.2
7.2	11	6.8	8	5
9.6	10	6.2	7	4.3
14.4	8.5	5.3	6	3.7
19.2	8	5	5.6	3.5

NOTE:

N2.4 = Native 2400 BPS

BR2.4 = Bit Repeat 2400 BPS

The 5812/11 can operate on the IBM Cabling System using the Types 1, 2 and 6 cables, with a maximum length of 5 km. However, when interconnecting more than two 5812/11 Modems via the IBM Cabling System, the rules for multipoint links, given above the table, still apply.

COMMUNICATION FACILITIES

Attachment to Facilities: Attachment of an IBM 5811 mdl 20 Stand-alone Modem to either In-plant or Out-plant lines will be by a cable supplied with the modem. Attachment to PTT facilities in countries where In-plant use only is specified is not allowed.

For attachment of 5811 mdl 28 Rackmount Modems to telecommunication facilities, see "Attachment to Facilities" in the M5810 Modem Enclosure sales pages.

Related Equipment: The 5811 Modem operates with IBM communication products capable of 2400, 4800, 7200, 9600, 14,400 or 19,200 bps synchronous or at specific speeds from 45.5 to 19,200 bps asynchronous operation. See M2700 pages. The 5811 Modem must communicate with another 5811/12 modem. By use of a special tailing cable the 5811 modem may serve as a tailed modem to an 3865 mdl 1 modem equipped with Data Multiplexing (feature #3260) or to other conventional long-haul modems.

The interconnecting cable between the business machine and the modem must be supplied by the business machine.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "5811/12 Modems Description and Planning Guide" (GA33-0081).

The customer is also responsible for:

- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.
- Private line (non-switched) channel -- arranging for the telecommunications service supplier to provide a baseband data channel. Also, arranging for the installation of the appropriate termination described in "Attachment to Facilities".
- Ensuring the availability of the interconnecting cable between the business machine and the modem because it must be supplied by the business machine.
- Ensuring the availability of the interconnection cable between the 5810 Modem Enclosure (in the case of model 28 Rackmount Modems) and the telecommunication lines.
- Unpacking and placing of the 5811. Physical setup, and connection of cables at setup time. During the physical setup, the position of the configuration switches located on the rear panel must be reviewed to ensure compatibility with the actual application. (Example: Point-to-point primary or secondary; multipoint control or tributary.)

Details are in "IBM 5811 and 5812 Modems, Setup, Problem Analysis, and Resolution", GA33-0082 shipped with each stand-alone modem or in "IBM 5810 Enclosure, 5811 and 5812 modems Set-Up, Problem Analysis and Resolution", GA33-0083 shipped with each rack-mount modem and with the 5810.

- Performing problem analysis and resolution.

Publications: See "KWIC Index", G320-1621, or specific systems bibliography.

SPECIFY

No specify codes are required since all country specifics (transmit levels, documentation language, front panel language, primary voltage, and power plug configuration) are identified with a 3-digit country code and predetermined at the factory.

- (Japan only > Power 100V AC, 1-phase, 2-wire, 50/60 Hz) 2.0m (6.5 ft) power cable, direct plug-in transformer, non-locking plug for mdl 20 only. Mdl 28 receives its power from the 5810 Modem Enclosure. (No specify code required.) <
- Language Groups: The 3-digit country code is used to select the language which meets the requirements of the country as follows:

English
(Japan only > Japanese <)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS

The stand-alone 5811 mdl 20 can be converted by the customer to a rackmount 5811 mdl 28 and installed in a 5810 modem enclosure. The procedure is documented in the "5810 Enclosure, 5811 and 5812 Modems, Setup, Problem Analysis and Resolution Guide", GA33-0083. This procedure can be reversed and is also documented in the same guide.

ACCESSORIES

These items are purchase-only and must be ordered separately for the modem.

Order the appropriate part number via Parts and Supplies Requisition.

Telecommunications Interconnect Cable (P/N 6089006): A 7.5m (25 ft.) telecommunications interconnect cable suitable for attaching a 5811 mdl 20 stand-alone modem to the termination point of a telecommunications line. The modem end has a 9-pin type D sub-miniature connector to mate with the modem. The line end has four spade lugs for attaching to a terminal block.

IBM Cabling System Attachment (P/N 6339098): Allows attachment of stand-alone models to the IBM Cabling System.

Tail Circuit Attachment (P/N 8547438): Allows a 5811 modem to attach, as a tailed modem, to a conventional long-haul modem or to another 5812/11 limited distance modem. For example, this accessory may be used to attach a 5811 modem to an IBM 5865 and 5866 mdl 3 or a 3865 mdl 1 modem equipped with Data Multiplexing (feature #3260). Permits an extension of a network via a separate set of modems and a separate communications link. When so connected, LPDA-1 support is unavailable on any section of the cascaded link and the line must be generated LPDA = NO.

SUPPLIES (NONE)

Ordering instructions: Order via standard AAS ordering.

Country	In-Plant	Out-Plant
Japan	Y	N

5812 LIMITED DISTANCE MODEM

PURPOSE

The 5812 Modems, models 10 (stand-alone) and 18 (rackmount), are Communications Network Management (CNM) Limited Distance Baseband modems to support synchronous data transmission at speeds of 2400, 4800, 7200, 9600, 14,400, or 19,200 bps. They can also serve as "non-CNM" LDMs to support asynchronous transmission at speeds, 45.5, 50, 75, 134.5, 300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 14,400 or 19,200 bps. On four-wire circuits they can operate in point-to-point or multipoint configurations using half-duplex or full-duplex transmission. On two wire circuits, they can operate in point-to-point configurations using half-duplex transmission. Operation is across a DCE to DTE interface defined by RS-232-C (CCITT, V.24, V.28 and ISO 2110) on circuits having metallic continuity. A typical range is 7.5 miles for 9600 bps transmission over no. 22 AWG (0.6 mm) wire.

This advanced microprocessor-based modem has automatic line equalization and incorporates extensive diagnostic capabilities both locally and through a central computer sight utilizing LPDA-1 commands. Transmission speed, link configuration, etc. are set by operator accessible set-up switches on the rear panel. 4-wire/2-wire and transmit level options are customer selectable by modem card jumpers.

MODELS

Model 10 010: A stand-alone unit with Communications Network Management capability which operates in half-duplex over 4-wire or 2-wire, or duplex mode over 4-wire non-switched duplex facilities having metallic continuity. Operates in synchronous point-to-point, multipoint control, or multipoint tributary mode, or asynchronous point-to-point. 2-wire operation must also be point-to-point. The Communications Network Management capability operates in synchronous mode and non-tailing environments only.

Model 18 018: A rackmount unit with the same characteristics as Model 010. Model 018 requires an 5810 Modem Enclosure.

Prerequisites:

- Software required for CNM mode support. (Synchronous, non-Tailing only)
 - NetView
 - ACF/NCP Version 4, Release 2
 - ACF/SSP Version 3, Release 2
 - ACF/VTAM Version 3, Release 1.1

The 5812-010, 5812-018, 5811-020, 5811-028, 5811-010 and 5811-018 can all be configured via the user option switches to be operationally compatible with one another at the functional compatibility of the lesser model.

Customer Setup (CSU): The 5812 is designed to be set-up by the customer. This provides the customer with early availability. This also allows relocation of the unit without requiring IBM service personnel assistance. Customer accessible setup switches are provided on the rear panel to enhance installability of the modem. A modem may be configured for point-to-point, multipoint control or multipoint tributary operation with the setup switches. Note: Some changes of the setup switches may require SYSGEN changes in the program support.

In countries where Customer Setup is prohibited or impractical, terms and conditions will include CE support for installation. Contact IBM to find out if Customer Setup applies.

HIGHLIGHTS

- Communications Network Management Capability via LPDA-1 commands for synchronous and non-tailing operations.
- Data Rate: 2400, 4800, 7200, 9600, 14,400 and 19,200 bps
- Synchronous/Asynchronous operation.
- Half/Full duplex.
- Stand-alone to Rack-mount convertibility.
- Configuration: Selectable by user option switches:
 - CNM/non-CNM
 - Control/Tributary
 - Point-to-point/Multipoint
 - Internal/External clock
 - Receive/Transmit impedances
 - Data Rate
 - Receive clock wrap
 - Antistreaming feature
 - RTS/RFS short/long delay
- 4-wire/2-wire and transmit level options are customer selectable by modem card jumpers.
- Automatic and Adaptive Equalization: Equalization is automatically performed by the modem and continues to adapt while in data mode.
- Operator Panel with operational status indicators.
- Extensive manual test facilities
- Selectable Receive/Transmit impedances
- Model 10 has an external direct-plug power transformer with a 2.0m (6.5 ft) power cable.
- Modem provides its own clocking or will accept DTE (external) clocking.

LPDA-1 functions can be initiated by a network operator from a CNM host with proper software support. Information is returned to the host to aid in problem analysis and isolation. See appropriate software documentation for specifics on command structure and operations for initiating LPDA-1 functions. These functions include the following:

- Local Self Test
 - The Local Self Test tests the modem while isolating it from its environment.
 - If the local modem is configured as the primary control LDM in point-to-point or multipoint applications then a self-test of all remote LDMs is also performed.
- Local LDM Status Report
 - When issued by the local DTE, it is informed of the status and quality of data transmission as seen by the local LDM during normal signal reception from the remote LDM.
- Remote LDM Self-test
 - This test is functionally equivalent to the Local LDM self-test. However, only the remote LDM is tested.
- Local/Remote LDM Status Report
 - Through this command the status and the quality of data transmission is provided as seen by both the local and the remote LDM.
- Remote DTE Interface Status Report

- The current state of the selected remote DTE interface leads and their state transition is reported as the result of this command.

Manual tests can be executed from the modem operator panel. These tests include:

- Local Self Test/Local Self Test with Wrap Plug
 - The Local Self Test tests the modem while isolating it from its environment.
 - The Local Self Test with Wrap Plug will test the modem and the EIA interface.
 - Both tests can be run on a multipoint tributary modem without interfering with the normal operation of the other stations on the multipoint link.
 - Both tests check the modem operation by first wrapping a test pattern from the transmit section to the receive section of the modem and then checking for errors (the telecommunications line is still connected to the nominal impedance).
- Local Loopback Test
 - The main purpose of the local Loopback Test is to verify the DTE interface.
 - The test can be run on a multipoint tributary modem without interfering with the normal operation of the rest of the multipoint link.
 - This is either a manual or an automatic test. It must be run with the associated DTE which sends a test pattern to the modem, where it is wrapped back to the DTE for error checking. (The telecommunication line is still connected to the nominal impedance.)
- Loop Transmit Test (4 Wires)
 - The Loop Transmit Test enables the telecommunications line and the remote modem to be checked from the control/primary modem without any remote operator. It is not allowed from the tributary/secondary modem.
 - The control/primary modem transmits a test pattern over the data link to the remote modem. The remote modem wraps the received test pattern back to the control/primary modem, where it is compared against the pattern transmitted. For this test, DTEs are not required at either location.
- Remote Loopback Test (4 Wires)
 - The Remote Loopback Test has the same purpose as the Loop Transmit Test, except that it is the DTE which generates the test pattern and compares it with the pattern received. This allows for inclusion of the EIA interface in the test procedure.
 - The test enables the control/primary DTE-to-modem interface, the control/primary modem operation, the telecommunication line and the remote modem operation to be checked.
 - The test can be run only from point-to-point primary modems or multipoint control modems.
 - For this test, an attached DTE that can transmit and receive a data test pattern is required at the control/primary modem location. A DTE is not required at the remote modem location.
 - This test can also be automatic, i.e. issued by a DTE with appropriate hardware and software support.
- Transmit/Receive Test (2 Wires)
 - This test allows the primary modem to check both the telecommunication line and the remote modem without

remote operator involvement. It is only available in point-to-point link (2 wires, half duplex).

- The primary modem sends an SDLC message to the secondary modem and checks for response after which a test pattern is transmitted to the secondary. The secondary modem informs the primary of any error detected during this test.
- Lamp Test/Data Rate Indication
 - When pushbutton number 6 is pushed and held for two seconds or less all lamps are lit.
 - If this pushbutton is held more than two seconds, the data rate is displayed on four operator panel lamps.

Base Band lines are defined as:

- Metallic continuity lines.
- 4 wires/2 wires twisted pair.

It is recommended that individually twisted pair cable be used. For excessively noisy environments it is necessary for the twisted pairs to be individually shielded.

- A multi-twisted pair cable.

For this case the transmit and receive pairs must be connected by pair. There must be no wire having a high level signal (e.g. dial or ringer pulses) in the same cable.

The following table shows the maximum transmission distances for point-to-point links for various speed versus wire gauge size combinations which may be used.

For multipoint links having a remote star configuration, the main line transmission distance may be the same as that shown for point-to-point links. For multipoint links having a distributed configuration, the main line transmission distance is limited to half that shown for point-to-point links. In either case, the stub length is limited to 200m (656.2 ft). Stub length is the distance between the tributary modem and the point where it attaches to the main line.

K bps	WIRE GAUGE (AWG) UNLOADED			
	0.8mm # 20		0.6mm # 22	
	km	mi	km	mi
N2.4	30	18.7	21	13
BR2.4	24	15	17	10.5
4.8	24	15	17	10.5
7.2	21	13	14	8.7
9.6	18	11.2	12	7.5
14.4	18	11.2	11	6.8
19.2	17	10.6	10	6

K bps	WIRE GAUGE (AWG) UNLOADED			
	0.5mm # 24		0.4mm # 26	
	km	mi	km	mi
N2.4	17	10.6	13	8.1
BR2.4	14	8.7	10	6.2
4.8	14	8.7	10	6.2
7.2	11	6.8	8	5
9.6	10	6.2	7	4.3
14.4	8.5	5.3	6	3.7
19.2	8	5	5.6	3.5

NOTE:

N2.4 = Native 2400 BPS
BR2.4 = Bit Repeat 2400 BPS

The 5812/11 can operate on the IBM Cabling System using the Types 1, 2 and 6 cables, with a maximum length of 5 km. However, when interconnecting more than two 5812/11 Modems via the IBM Cabling System, the rules for multipoint links, given above the table, still apply.

COMMUNICATION FACILITIES

Attachment to Facilities: Attachment of an IBM 5812 mdl 10 Stand-alone Modem to either In-plant or Out-plant lines will be by a cable supplied with the modem. Attachment to PTT facilities in countries where In-plant use only is specified is not allowed.

For attachment of 5812 mdl 18 Rackmount Modems to telecommunication facilities, see "Attachment to Facilities" in the 5810 Modem Enclosure sales pages.

Related Equipment: The 5812 Modem operates with IBM communication products capable of 2400, 4800, 9600, or 19,200 bps operation. See M2700 pages. The 5812 Modem must communicate with another 5812 modem. By use of a special tailing cable the 5812 modem may serve as a tailed modem to an IBM 3865 Mdl 1 modem equipped with Data Multiplexing (feature #3260) or to other conventional long-haul modems.

The interconnecting cable between the business machine and the modem must be supplied by the business machine.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "5811/12 Modems Description and Planning Guide" (GA33-0081).

The customer is also responsible for:

- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.
- Private line (non-switched) channel -- arranging for the telecommunications service supplier to provide a baseband data channel. Also, arranging for the installation of the appropriate termination described in "Attachment to Facilities".
- Ensuring the availability of the interconnecting cable between the business machine and the modem because it must be supplied by the business machine.
- Ensuring the availability of the interconnection cable between the 5810 Modem Enclosure (in the case of mdl 18 Rackmount Modems) and the telecommunication lines.
- Unpacking and placing of the 5811. Physical setup, and connection of cables at setup time. During the physical setup, the position of the configuration switches located on the rear panel must be reviewed to ensure compatibility with the actual application. (Example: Point-to-point primary or secondary; multipoint control or tributary.)

Details are in "IBM 5811 and 5812 Modems, Setup, Problem Analysis and Resolution", GA33-0082 shipped with each stand-alone modem or in "IBM 5810 Enclosure, 5811 and 5812 modems Set-Up, Problem Analysis and Resolution", GA33-0083 shipped with each rack-mount modem and with the 5810 Modem Enclosure.

- Performing problem analysis and resolution.

Publications: See "KWIC Index", G320-1621, or specific systems bibliography.

SPECIFY

No specify codes are required since all country specifics (transmit levels, documentation language, front panel language, primary voltage, and power plug configuration) are identified with a 3-digit country code and predetermined at the factory.

- (Japan only) > Power 100V AC, 1-phase, 2-wire, 50/60 Hz) 2.0m (6.5 ft) power cable, direct plug-in transformer, non-locking plug for mdl 10 only. Mdl 18 receives its power from the 5810 Modem Enclosure. (No specify code required.) <
- Language Groups: The 3-digit country code is used to select the language which meets the requirements of the country as follows:

English
(Japan only > Japanese <)

(No specify code is required).

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS

The stand-alone 5812 mdl 10 can be converted by the customer to a rackmount 5812 mdl 18 and installed in a 5810 modem enclosure. The procedure is documented in the "5810 Enclosure, 5811 and 5812 Modems, Setup, Problem Analysis and Resolution Guide", GA33-0083. This procedure can be reversed and is also documented in the same guide.

ACCESSORIES

These items are purchase-only and must be ordered separately for the modem. Order the appropriate part number via Parts and Supplies Requisition.

Telecommunications Interconnect Cable (P/N 6089006): A 7.5m (25 ft.) telecommunications interconnect cable suitable for attaching a 5812 mdl 10 stand-alone modem to the termination point of a telecommunications line. The modem end has a 9-pin type D sub-miniature connector to mate with the modem. The line end has four spade lugs for attaching to a terminal block.

IBM Cabling System Attachment (P/N 6339098): Allows attachment of stand-alone models to the IBM Cabling System.

Tail Circuit Attachment (P/N 8547438): Allows a 5811/12 modem to attach, as a tailed modem, to a conventional long-haul modem or to another 5812/11 limited distance modem. For example, this accessory may be used to attach a 5811/12 modem to an IBM 5865 and 5866 mdl 3 or an 3865 mdl 1 modem equipped with Data Multiplexing (feature #3260). Permits an extension of a network via a separate set of modems and a separate communications link. When so connected, LPDA-1 support is unavailable on any section of the cascaded link and the line must be defined LPDA = NO.

SUPPLIES (NONE)

Ordering instructions: Order via standard AAS ordering.

Country	In-Plant	Out-Plant
Japan	Y	N

5865 MODEM**PURPOSE**

A 9600 bps synchronous, high performance microprocessor based modem that is designed for both the network operator and the IBM Communication Network Management (CNM) capabilities. These modems use a Keypad/Display to configure the modem's characteristics, such as Point-To-Point or Multipoint mode, display line parameters, and request the execution of diagnostics. It operates over Basic (unconditioned) 4-wire leased (non-switched) medium speed voice-grade telecommunication facilities.

The modem's diagnostic functions operate with NetView or Network Problem Determination Application (NPDA), providing:

- Probable cause of network errors.
- Alert messages on error threshold.
- Formatted modem test results.

MODELS

Model 1 001: Allows synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities. Operates in point-to-point, multipoint control or multipoint tributary mode.

Model 2 002: Allows synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities. Operates in point-to-point, multipoint control, or multipoint tributary mode. Supports enhanced Link Problem Determination Aids (LPDA-2). Allows Switched Network Back-Up when an SNBU feature is installed. Available in Canada, France, Italy, UK. Contact your country headquarters.

Model 3 003: Allows synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities. Operates in point-to-point, multipoint control, or multipoint tributary mode. Provides DTE interface Fan-in/out with four ports. Support enhanced Link Problem Determination Aids (LPDA-2). Allows Switched Network Back-Up when an SNBU feature is installed. Available in Canada, France, Italy, UK. Contact your country headquarters.

Limitations: This modem uses a communication algorithm that is compatible only with 5868-51 or -52 (and 5866 or 5868-62 set in 5865 mode). Therefore, only 5865, 5868-51 or -52 (and 5866, 5868-62 set in 5865 mode) can be on the same communication link.

Customer Setup (CSU): This provides the customer with early availability and allows relocation of the unit without requiring IBM service personnel assistance.

There are no customer accessible setup switches because these functions are selected from the Keypad/Display (KD) front panel. This enhances the adaptability of the modem. A modem may be configured for point-to-point, multipoint control or multipoint tributary operation from either the local or the remote control modem's Keypad/Display. Modem configurations can also be performed from the host system using LPDA 2 level of support. Note: Some changes of the configuration may require SYSGEN changes in the program support.

In countries where Customer Setup is prohibited or impractical, terms and conditions will include CE support for installation. Contact IBM to find out if Customer Setup applies.

HIGHLIGHTS

- Data Rate: 9600 bps with backup of 7200 bps. In CCITT mode, a second backup speed of 4800 bps is available.
- A microprocessor for signal processing and network control.
- Operator Keypad/Display panel has a 16-character alphanumeric display for informational messages and a 20-key input keypad panel. In addition, there are indicators that continuously show the status of certain parameters, such as line condition and operate mode.
- Set of on-line and off-line diagnostic functions.
- Detailed measurement of analog line parameters.
- One model supports either Point-to-Point or Multipoint operation.
- Automatic Remote Speed Selection: The transmission speed of each remote Modem can be changed from the central site Modem (this function will not work in CCITT mode). Receiving Modems follow the speed of the transmitting modem.
- On a multipoint line, some tributary modems may be running in secondary speed while others are running in primary speed.
- Anti-Streaming: A multipoint tributary modem can automatically cut off transmission if a terminal holds "Request to Send" up longer than 20 seconds (an abnormal condition in IBM communication protocol). This is a customer selectable option from the Keypad/Display panel.
- Automatic and Adaptive Equalization: Equalization is automatically performed by the modem and continues to adapt while in data mode.
- Modem provides its own clocking or will accept DTE clocking or will use its receive clocking.
- The modem diagnostic functions, referred to as Link Problem Determination Aid (LPDA), operate with Systems Network Architecture (SNA) and associated program products. Under control of these programs, the modem accepts commands and initiates tests that help isolate problems to the line, local or remote modem, or elsewhere in the network and provides the network operator with the most probable cause of network problems.
- Fan-Out (mdl 3 only): The 5865 mdl 3 provides four Data Terminal Equipment (DTE) interfaces to attach up to four DTEs. They allow Fan-In (attachments to Communication Controllers) or Fan-Out (attachments to terminals).

Fan-In may be used to attach a modem to two Controllers for back-up purpose, under control of the system operator (no system support available).

Fan-Out may be used to attach several DTEs to one modem under the control of a multipoint line procedure.

Although DTEs should be controlled so as no more than one DTE transmits at a time, contentions are handled according to Request-To-Send on a first requested/first served basis.

Each DTE interface status of a remote Modem can be displayed on the central site Modem display (5865 Mdls 2 or 3 or 5868 Mdl 52 only). Same information is also available from the host System via the NetView Hardware Monitor (NPDA). This requires LPDA 2 support in the host System (Refer to "Software Requirements" section).

LPDA support is provided for the primary link, the secondary link with 5865 mdls 2 or 3 and the remote DTEs attached to the secondary link, if both links are defined for LPDA 2 support. Other DTEs directly attached to the 5865 or 5868 mdl 3 of the primary link must be defined as non-LPDA by using the 'LPDA blocked by station' ACF/NCP function.
- Switched Network Back-Up (SNBU): The 5865 mdls 2 and 3 can be equipped with either a 2-wire SNBU Coupler (# 7952) or a 4-wire SNBU Coupler (#7953).

The SNBU couplers allow restoration of communications with a remote Modem in case of leased line failure by using the Public Switched Network. Available in Canada, France, Italy, UK. Contact your IBM Marketing Representative.

The 2-wire SNBU Coupler requires only one telephone call. It provides transmission at 4800 bps (CCITT V27ter) in Half Duplex mode (the DTE must drop the RTS interface circuit while not transmitting).

When the 2-wire SNBU is active, LPDA 1 is not supported and the LPDA 2 tests 'Transmit/Receive' and 'Line Analysis' are not supported.

The 4-wire SNBU Coupler requires two telephone calls. It provides Full Duplex communication as if the Modem was operating in leased line mode (i.e., 14,400 or 9600 bps according to the Modem type/model).

Both Couplers provides auto-answer and auto-disconnect. Calls can be made in the following ways:

- Manually with a telephone set associated with the Coupler Line.
- Dialing from the Modem operator panel keypad.
- Dialing from the Modem operator panel, using a pre-stored telephone number.
- Dialing from the host System via the NetView Command Facility. The command may include the telephone number(s) or assume telephone number(s) pre-stored in the Modem. This mode requires LPDA 2 support in the host System (Refer to "Software Requirements").

Coupler dialing is performed in pulse or tone mode. SNBU Coupler functions (Modem and/or System dialing) may be limited in some countries. Contact your IBM Representative. The SNBU Couplers are Customer Set-Up/Customer Replaceable Units.

CONTACT SENSE/CONTACT OPERATE

The 2-wire SNBU Coupler (#7952) includes the capability to sense the status of a contact and to operate a relay contact in the customer installation. The function may be operated at a remote modem site manually from the central site modem operator panel or from the host system. Each Sense/Operate operation from the host system must be solicited via the NetView Command Facility (NCCF). This requires LPDA 2 support in the host System (Refer to "Software Requirements" section).

Caution: The Contact/Sense function is intended for use in monitoring and controlling situations that might directly improve customer operations or productivity. Any contact/sense function running as a subordinate function in a telecommunications network can be compromised inadvertently by network switching, network traffic re-routing, temporary loss of intermediate network nodes or circuits, or thru normal or abnormal termination of supporting data processing applications and/or systems. Customers are advised that this function is NOT intended for use in situations that involve security of customer assets, could compromise safety of personnel or in any medical or non-medical application where vital life-sign management, such as patient monitoring, is being performed.

The interface of the Contact Sense/Operate function between the Modem and the customer installation is typical of low power electromechanical controls. A detailed physical and electrical description is given in the "IBM 5865, 5866 and 5868 Modems Description and Planning Guide" (GA33-0057).

Modem Diagnostics: All modems will respond to diagnostic commands from its own panel, the control modem's panel, or from the host system that helps provide status of any modem on the link, its attached terminal, plus quality and level of the received signal over the communication facility. Test requests and responses utilize the same data path and controls that are used for data transmission. Thus, diagnostic status/test requests can be interspersed with data requests without interrupting terminal sessions.

System Diagnostics: On S/370, 30xx, 43xx, and 937x the IBM NetView Program Product or the previous IBM NCCF and NPDA

Program Products are required to support IBM's Communications Network Management:

NetView Command Facility (NCCF): Application interface program permitting the network operator to remotely control and test the modem-line-modem complex.

NetView Hardware Monitor (NPDA): Collects, processes and displays both summary and detailed level information for determining probable causes of network errors. Probable cause differentiates among errors in an IBM Communication or Network Controller, Lines, Modems, Modem Interfaces, or Terminals.

It provides alert messages and displays formatted modem test results for all LPDA Modems, including those Modems upstream and downstream of the IBM 3720 or the IBM 3710 (in LPDA 1 mode only).

The following program products at the stated level or subsequent levels, unless otherwise specified, may be used:

- For LPDA-2 and LPDA-1 support:
 - ACF/NCP Version 4 Release 2 for 3725 and 3720
 - NetView
 - ACF/VTAM Version 3 Release 1.1
- For LPDA-1 support only:
 - Network Problem Determination Application (NPDA) Version 3 Release 2
 - Network Communication Control Facility (NCCF) Version 2 Release 2
 - ACF/NCP Version 3 for 3705, 3720, and 3725
 - ACF/VTAM Version 2 R2

LPDA 1 functions require a 3705, 3725, 3720, 3710, S/36 or a 8100. LPDA 2 functions require a 3725 at Microcode EC Level 873055 (Field mandatory, available July 31, 1986) or at Release 4 level or a 3720. LPDA 2 can only operate on links running in SDLC or BSC (EBCDIC, ASCII or TRANSPARENT) mode. LPDA 2 does not use the #18 lead of the DTE interface.

System 36 supports the modems at LPDA 1 level with SSP version 4.

The 8100 systems will support the modems with a subset of LPDA 1 using either DPCX or DPPX at the stated levels or subsequent levels, unless otherwise specified:

DPPX/SP02
 DPCX/Release 5 with PTF PUC03225

When the 'testlink' command is issued to obtain LPDA reports from a Data Link Attached modem, the results must be interpreted according to the following guidelines:

- DPCX/DPPX - The modem type field in the REMOTE MODEM TEST RESULTS screen is inaccurate.
- DCPX - Test failures involving the Basic card in the modem are reported as Front End (FE) card failures.
- DCPX - Modem operation at backup speed is reported as 'HALF' speed on the LINK STATUS AND RESULTS screen.

Manual Diagnostics: In addition, tests can also be executed from the modem operator panel. These manual tests include:

- Local self-test -- this includes an extensive test of modem microcode, plus a data wrap with reduced thresholds for received data (note 1).
- Remote self-test -- this includes an extensive test of modem microcode (note 1).
- Analog test (Line Analysis) -- displays telephone line parameters (note 2).
- Local loop-back test -- provides a CCITT Loop 3 test (note 1).
- Local Status -- displays status of local modem.
- Remote Status -- displays status of remote addressed modem (note 1). If the Remote modem is a 5865 mdl 3, the local modem must be a 5865 mdl 2 or 3 or a 5868 mdl 52.
- Digital test (Transmit/receive) -- allows loop test with remote addressed modem (note 2).

Notes:

1. Not available in SNBU mode
2. Not available in 2-wire SNBU mode

Extended Diagnostics: This 386X Modem feature is a standard 5865 function to enhance the diagnostic capabilities of the modems. It provides an additional facility allowing a differentiate between modem failures, line failures and remote modem power loss.

Customer Assistance

On-Site Assistance: If a customer desires on-site assistance to perform problem determination, the customer may call the Marketing Representative to arrange for IBM on-site assistance. IBM will assist the customer on-site in performing problem determination procedures using the same documentation that is available to the customer. On-site assistance is provided at the applicable IBM hourly service rate and minimum charges.

COMMUNICATION FACILITIES

PTT Facilities: Telecommunication lines according to CCITT recommendations, M1020 or M1025 can be used. See IBM for availability of such facilities in your country. UK Note: British Telecommunications Schedule "B" nonswitched lines can be used.

Privately-Owned Communication Facilities: Equivalent to above.

International Facilities: Request IBM to contact IBM coordinators of the other countries involved to determine the availability of such facilities.

Transmission of data between the United States and Canada is supported. The channel in Canada must be schedule 4, type 4.

Related Equipment: The 5865 modem operates with IBM communication products capable of 9600 bps operation. See M2700 pages. The 5865 modem must communicate with another 5865 modem, a 5868-51 or -52 modem, a 5866 or 5868-52 modem operating in 5865 mode. The interconnecting cable between the business machine and the modem must be supplied by the business machine.

Note: The LPDA functions of the 5865 modems will not operate when the 3845 or 3846 Data Encryption Devices are used to encrypt data over the communication line.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "IBM 5865, 5866 and 5868 Description and Planning Guide", GA33-0057.

The customer is also responsible for:

- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.
- Private line (nonswitched) channel -- arranging for the telecommunications service supplier to provide a voice-grade data channel. Also, arranging for the installation of the appropriate receptacle described in "Attachment to Facilities".
- Ensuring the availability of the interconnecting cable between the business machine and the modem because it must be supplied by the business machine.
- Unpacking and placing of the unit. Physical setup and connection of the cables at setup time. During the physical setup, the configuration routine may be executed from the front panel or from the control modem's front panel. This configuration must be reviewed to ensure compatibility with the actual application. (Example: Point-to-point primary or secondary; multipoint control or tributary.) Details are in the "IBM 5865, 5866 Setup and User's Guide", GA33-0038 for Mdl 1 and GA33-0085 for mdls 2 and 3.

- Performing Problem Analysis and Resolution.

Publications: See "KWIC Index", G320-1621, or specific systems bibliography.

SPECIFY

- Power (AC, 1-phase, 3-wire, 50/60 Hz): 2.8m (9 ft) power cable.

The 3-digit country code is used to select the voltage range which meets the requirements of the country and no specify code is required. In countries where two voltage ranges are available (refer to the table in the Ordering Instruction section), select by specifying the alternate voltage as follows:

100/127V Default, no specify code required
200/240V Specify: #2806

The 3-digit country code is used to select a power cord and plug which meets the requirements of that country.

The 3-digit country code is used to select the language which meets the requirements of the country (Languages provided are: English, French, Japanese and Spanish). No specify code is required, except in Canada:

English #2924
French #2928

- Telecommunications Cable (modem to telecommunications line connection): 7.5m (25 ft) (no specify code required).

SPECIAL FEATURES

Switched Network Back-Up 2-Wire (#7952): The 2-wire SNBU Coupler requires only one telephone call. It provides Half Duplex transmission at 4800 bps (CCITT V27ter). Available in Canada, France, Italy, UK.

Contact Sense/Contact Operate: The 2-wire SNBU Coupler (#7952) includes the capability to sense the status of a contact and to operate a relay contact in the customer installation. The function may be operated at a remote modem site from the central site modem operator panel or from the Host System using the NetView Command Facility (NCCF). See detailed description and warning notice in the description section above. Limitation: Models 2 and 3 only.

Switched Network Back-Up 4-Wire (#7953): The 4-wire SNBU Coupler requires two telephone calls. It provides Full Duplex communication as if the Modem was operating in leased line mode (i.e., 9600 bps with back-up at 7200 bps). Available in Canada, France, Italy, UK. Limitation: Models 2 and 3 only.

MODEL CONVERSIONS

Consult your Communication Marketing support.

ACCESSORIES

These items are purchase-only and must be ordered separately from the modem. Order the appropriate part number via IBM Direct or as IBM supplies.

Rack Mount Shelf (P/N 8547412): A rack adapter that fastens inside a standard 19 inch EIA rack. The adapter, which fits racks that have a depth of 60cm (23.6 in.) to 76cm (30 in.) and an opening of 45cm (17.7 in.) will hold two stand-alone modems side-by-side.

Tailing Attachment Cable (P/N 8547438): Attaches a 5865 mdl 2 or mdl 3 to a 5865 mdl 3.

IBM IBM Canada Ltd.

MACHINES

M 5865.4
FEB 87

SUPPLIES (NONE)

ORDERING INSTRUCTIONS

Order via standard AAS ordering.

5866 MODEM

PURPOSE

A 14,400 bps, synchronous, high performance, microprocessor based modem that is designed for both the network operator and the IBM Communication Network Management (CNM) capabilities. These modems use a Keypad/Display to configure the modem's characteristics, such as Point-To-Point or Multipoint mode, display line parameters, and request the execution of diagnostics. It operates over Basic (unconditioned) 4-wire leased (non-switched) medium speed voice-grade telecommunication facilities.

The modem's diagnostic functions operate with NetView or Network Problem Determination Application (NPDA), providing:

- Alert messages on error threshold.
- Probable cause of network errors.
- Formatted modem test results.

MODELS

Model 1 001: Allows synchronous data transmission in half-duplex or duplex mode over 4-wire nonswitched duplex facilities. Operates in point-to-point, multipoint control, or multipoint tributary mode.

Model 2 002: Allows synchronous data transmission in half-duplex or duplex mode over 4-wire nonswitched duplex facilities. Operates in point-to-point, multipoint control, or multipoint tributary mode. Supports enhanced Link Problem Determination Aids (LPDA-2). Allows Switched Network Back-Up when a SNBU feature is installed. Available in Canada, France, Italy, UK. Contact your country headquarters.

Model 3 003: Allows synchronous data transmission in half-duplex or duplex mode over 4-wire nonswitched duplex facilities. Operates in point-to-point, multipoint control, or multipoint tributary mode. Provides DTE interface Fan-in/out with four ports. Support enhanced Link Problem Determination Aids (LPDA-2). Allows Switched Network Back-Up when a SNBU feature is installed. Available in Canada, France, Italy, UK. Contact your country headquarters.

Limitations: This modem uses a new communication algorithm, called TRELLIS coding, that is compatible only with 5868-61 or -62. Therefore, only 5868-61 or -62 and 5866 in 5866 mode can be on the same communication link. When the 5866 is operating in the 5865 mode, it will only communicate with 5865's, 5868-51 or -52, and 5866's that are also in the 5865 mode.

Customer Setup (CSU): This provides the customer with early availability. Also, this allows relocation of the unit without requiring IBM service personnel assistance.

There are no customer accessible setup switches because these functions are selected from the Keypad/Display (KD) front panel. This enhances adaptability of the modem. A modem may be configured for point-to-point, multipoint control or multipoint tributary operation from either the local or the remote control modem's Keypad/Display.

Modem configurations can also be performed from the host System using LPDA 2 level of support. Note: Some changes of the configuration may require SYSGEN changes in the program support.

In countries where Customer Setup is prohibited or impractical, terms and conditions will include CE support for installation. Contact IBM to find out if Customer Setup applies.

HIGHLIGHTS

- Data Rate: In normal 5866 mode, the data rate is 14,400 bps with backup of 12,000 bps. If the modem is running in 5865

mode, 9600 bps is the primary speed with 7200 bps the backup speed. In Multipoint mode, the tributary modems transmit at 9600 bps with backup of 7200 bps.

- A microprocessor for signal processing and network control
 - Operator Keypad/Display panel has a 16 character alphanumeric display for informational messages and a 20 key input keypad panel. In addition, there are indicators that continuously show the status of certain parameters, such as line condition and operate mode.
 - Set of on-line and off-line diagnostic functions
 - Detailed measurement of analog line parameters
 - One model supports either Point-To-Point or Multipoint operation
 - Automatic Remote Speed Selection: The transmission speed of each remote Modem can be changed from the central site Modem (this function will not work in CCITT mode). Receiving Modems follow the speed of the transmitting modem.
 - On a multipoint line, some tributary modems can be running in secondary speed while others are running in primary speed
 - Anti-Streaming: A multipoint tributary modem can automatically cut off transmission if a terminal holds "Request to Send" up longer than 20 seconds (an abnormal condition in IBM communication protocol). This is a Customer selectable option from the Keypad/Display panel.
 - Automatic and Adaptive Equalization: Equalization is automatically performed by the modem and continues to adapt while in data mode.
 - Modem provides for transmission its own clocking or will accept DTE clocking or will use its receive clocking.
 - The modem diagnostic functions, referred to as Link Problem Determination Aid (LPDA), operate with Systems Network Architecture (SNA) and associated program products. Under control of these programs, the modem accepts commands and initiates tests that help isolate problems to the line, local or remote modem, or elsewhere in the network and provides the network operator with the most probable cause of network problems.
 - Fan-Out (Model 3 only): The 5866 Mdl 3 provides 4-Data Terminal Equipment (DTE) interfaces to attach up to 4 DTEs. They allow Fan-In (attachments to Communication Controllers) or Fan-Out (attachments to terminals).
- Fan-In may be used to attach a modem to two Controllers for back-up purpose, under control of the system operator (no system support available).
- Fan-Out may be used to attach several DTEs to one modem under the control of a multipoint line procedure.
- Although DTEs should be controlled so as no more than one DTE transmits at a time, contentions are handled according to Request-To-Send on a first requested/first served basis.
 - Each DTE interface status of a remote Modem can be displayed on the central site Modem display (5866 Mdl 2 or 3 or 5868 Mdl 62 only). Same information is also available from the host System via the NetView Hardware Monitor (NPDA). This requires LPDA 2 support in the host System (Refer to Software Requirements section).
 - Modem Tailing: 5866 Mdl 3's can support one tailed modem link, by attaching it to a 5866 mdl 2 or a 5811 mdl 20 or a 5812 mdl 10. A special Modem to Modem cable is required for each modem detailed to a 5866 mdl 3. See in the Accessory section.
 - LPDA support is provided for the primary link, the secondary link with 5866 Mdl 2 or 3 and the remote DTEs attached to the

secondary link, if both links are defined for LPDA 2 support. Other DTEs directly attached to the 5866 or 5866 Mdl 3 of the primary link must be defined as non-LPDA by using the 'LPDA blocked by station' ACF/NCP function.

- Switched Network Back-Up (SNBU): The 5866 Mdl 2 and 3 can be equipped with either a 2-wire SNBU Coupler (#7952) or a 4-wire SNBU Coupler (#7953).

The SNBU couplers allow restoration of communications with a remote Modem in case of leased line failure by using the Public Switched Network. Available in Canada, France, Italy, UK. Contact your IBM Marketing representative.

The 2-wire SNBU Coupler requires only one telephone call. It provides transmission at 4800 bps (CCITT V27ter) in Half Duplex mode (the DTE must drop the RTS interface circuit while not transmitting).

When the 2-wire SNBU is active, LPDA 1 is not supported and the LPDA 2 tests 'Transmit/Receive' and 'Line Analysis' are not supported.

The 4-wire SNBU Coupler requires two telephone calls. It provides Full Duplex communication as if the Modem was operating in leased line mode (i.e. 14,400 or 9600 bps according to the Modem type/mode).

Both Couplers provides auto-answer and auto-disconnect. Calls can be made in the following ways:

- Manually with a telephone set associated with the Coupler line.
- Dialing from the Modem operator panel keypad.
- Dialing from the Modem operator panel, using a prestored telephone number.
- Dialing from the host System via the NetView Command Facility. The command may include the telephone number(s) or assume telephone number(s) pre-stored in the Modem. This mode requires LPDA 2 support in the host System (Refer to Software requirements).

Coupler dialing is performed in pulse or tone mode.

- SNBU Coupler functions (Modem and/or System dialing) may be limited in some countries. Contact your IBM representative.
- The SNBU couplers are Customer Set-Up/Customer Replaceable Units.

CONTACT SENSE/CONTACT OPERATE

The 2-Wire SNBU Coupler (#7952) includes the capability to sense the status of a contact and to operate a relay contact in the customer installation. The function may be operated at a remote modem site manually from the central site modem operator panel or from the host System.

Each Sense/Operate operation from the host System must be solicited via the NetView Command Facility (NCCF). This requires LPDA 2 support in the host System (Refer to Software Requirements section).

Caution: The Contact/Sense function is intended for use in monitoring and controlling situations that might directly improve customer operations or productivity. Any contact/sense function running as a subordinate function in a telecommunications network can be compromised inadvertently by network switching, network traffic re-routing, temporary loss of intermediate network nodes or circuits, or thru normal or abnormal termination of supporting data processing applications and/or systems. Customers are advised that this function is NOT intended for use in situations that involve security of customer assets, could compromise safety of personnel or in any medical or non-medical application where vital life-sign management, such as patient monitoring, is being performed.

The interface of the Contact Sense/Operate function between the Modem and the customer installation is typical of low power electromechanical controls. A detailed physical and electrical description is given in the "IBM 5866, 5866 and 5868 Modems Description and Planning Guide" (GA33-0057).

Modem Diagnostics: All modems will respond to diagnostic commands from it's own panel, the control modem's panel, or from the host system that help provide status of any modem on the link, its attached terminal, plus quality and level of the received signal over the communication facility. Test requests and responses utilize the same data path and controls that are used for data transmission. Thus, diagnostic status/test requests can be interspersed with data requests without interrupting terminal sessions.

System diagnostics: On S/370, 30xx, 43xx, and 937x the IBM NetView Program Product or the previous IBM NCCF and NPDA Program Products are required to support IBM's Communications Network Management:

- NetView Command Facility (NCCF): Application interface program permitting the network operator to remotely control and test the modem-line-modem complex.
- NetView Hardware Monitor (NPDA): Collects, processes and displays both summary and detailed level information for determining probable causes of network errors. Probable cause differentiates among errors in an IBM Communication or Network Controller, lines, Modems, modem interfaces, or Terminals.

It provides alert messages and displays formatted modem test results for all LPDA Modems, including those Modems upstream and downstream of the IBM 3720 or the IBM 3710 (in LPDA 1 mode only).

The following program products at the stated level or subsequent levels, unless otherwise specified, may be used:

- For LPDA-2 and LPDA-1 support:
 - ACF/NCP Version 4 Release 2 for 3725 and 3720.
 - NetView
 - ACF/VTAM Version 3 Release 1.1
- For LPDA-1 support only:
 - Network Problem Determination Application (NPDA) Version 3 Release 2.
 - Network Communication Control Facility (NCCF) Version 2 Release 2.
 - ACF/NCP Version 3 for 3705, 3720, and 3725.
 - ACF/VTAM Version 2 R2.

LPDA 1 functions require a 3705, 3725, 3720, 3710, S/36 or a 8100.

LPDA 2 functions require a 3725 at Microcode EC Level 873055 (Field mandatory, available July 31, 1986) or at Release 4 level or a 3720. LPDA 2 can only operate on links running in SDLC or BSC (EBCDIC, ASCII or TRANSPARENT) mode. LPDA 2 does not use the #18 lead of the DTE interface.

System 36 supports the modems at LPDA 1 level with SSP version 4.

The 8100 systems will support the modems with a subset of LPDA 1 using either DPCX or DPPX at the stated levels or subsequent levels, unless otherwise specified:

DPPX/SP02
DPCX/Release 5 with PTF PUC03225

When the 'testlink' command is issued to obtain LPDA reports from a Data Link Attached modem, the results must be interpreted according to the following guidelines:

- DPCX/DPPX - The modem type field in the REMOTE MODEM TEST RESULTS screen is inaccurate.
- DPCX - Test failures involving the Basic card in the modem are reported as Front End ('FE') card failures.
- DPCX - Modem operation at backup speed is reported as 'HALF' speed on the LINK STATUS AND RESULTS screen.

Manual diagnostics: In addition, tests can also be executed from the modem operator panel. These manual tests include:

- Local self-test -- this includes an extensive test of modem microcode, plus a data wrap with reduced thresholds for received data (note 1).
- Remote self-test -- this includes an extensive test of modem microcode (note 1).
- Analog test (Line analysis) -- displays telephone line parameters (note 2).
- Local loop-back test -- provides a CCITT Loop 3 test (note 1).
- Local status -- displays status of local modem.
- Remote status -- displays status of remote addressed modem (note 1).
- Remote status -- displays status of remote addressed modem (note 1). If the remote modem is a 5866 mdl 3, the local modem must be a 5866 mdl 2 or 3 or a 5868 mdl 62.
- Digital test (Transmit/receive) -- allows loop test with remote addressed modem (note 2).

Notes:

- Note 1: Not available in SNBU mode.
Note 2: Not available in 2 wire SNBU mode.

Extended Diagnostic: This 386X Modem feature is a standard 5866 function to enhance the diagnostic capabilities of the modems. It provides an additional facility allowing to differentiate between modem failures, line failures and remote modem power loss.

On-Site Assistance: If a customer desires on-site assistance to perform problem determination, the customer may call the marketing representative to arrange for IBM on-site assistance. IBM will assist the customer on-site in performing problem determination procedures using the same documentation that is available to the customer. On-site assistance is provided at the applicable IBM hourly service rate and minimum charges.

COMMUNICATION FACILITIES

PTT Facilities: Telecommunications lines according to CCITT recommendations, M1020 or M1025 may be used. See IBM for the availability of such facilities in your country. UK Note: British Telecommunications Schedule "B" nonswitched lines can be used.

Privately-owned Communication Facilities: Equivalent to above.

International Facilities: Request IBM to contact IBM coordinators of the other countries involved to determine the availability of such facilities.

Transmission of data between the United States and Canada is supported. The channel in Canada must be schedule 4, type 4.

Related Equipment: In the 5866 mode, the 5866 modem operates with IBM communication products capable of 14,400 bps operation. See M2700 pages. In the 5865 mode, the 5866 modem operates with IBM communication products capable of 9600 bps operation. See M2700 pages. The interconnecting cable between the business machine and the modem must be supplied by the business machine.

Note: The LPDA functions of the 5866 Modems will not operate when the 3845 or 3846 Data Encryption Devices are used to encrypt data over the communication line.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "IBM 5866, 5866 and 5868 Description and Planning Guide", GA33-0057.

The customer is also responsible for:

- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.

- Private line (nonswitched) channel -- arranging for the telecommunications service supplier to provide a voice-grade data channel. Also, arranging for the installation of the appropriate receptacle described in "Attachment to Facilities".
- Ensuring the availability of the interconnecting cable between the business machine and the modem because it must be supplied by the business machine.
- Unpacking and placing of the unit. Physical setup, and connection of cables at setup time. During the physical setup, the configuration routine may be executed from the front panel or from the control modem's front panel. This configuration must be reviewed to ensure compatibility with the actual application. (Example; Point-to-point primary or secondary; multi-point control or tributary.) Details are in the "IBM 5866, 5866 Setup and User's Guide", GA33-0038 for Model 1's, and GA33-0085 for models 2 and 3's.
- Performing Problem Analysis and Resolution.

Bibliography: See "KWIC Index", G320-1621, or specific systems bibliography.

SPECIFY

- Power (AC, 1-phase, 3-wire, 50/60 Hz): 2.8m (9 ft) power cable.

The 3-digit country code is used to select the voltage range which meets the requirements of the country and no specify code is required. In countries where two voltage ranges are available select by specifying the alternate voltage as follows:

100/127V Default, no specify code required.
200/240V Specify: #2806

The 3-digit country code is used to select a power cord and plug which meets the requirements of that country.

- Language Groups:

The 3-digit country code is used to select the language which meets the requirements of the country (Languages provided are: English, French, Japanese and Spanish) No specify code is required, except in Canada:

English #2924
French #2928

Telecommunications Cable (modem to telecommunications line connection): 7.5m (25 ft) (no specify code required).

SPECIAL FEATURES

Switched Network Back-Up 2-Wire (#7952): The 2-wire SNBU Coupler requires only one telephone call. It provides Half Duplex transmission at 4800 bps (CCITT V27ter). Available in Canada, France, Italy, UK.

CONTACT SENSE/CONTACT OPERATE

The 2-Wire SNBU Coupler (#7952) includes the capability to sense the status of a contact and to operate a relay contact in the customer installation. The function may be operated at a remote modem site from the central site modem operator panel or from the Host System using the NetView Command Facility (NCCF). See detailed description and warning notice in the description section above. Limitation: Model 2 and 3 only.

Switched Network Back-Up 4-Wire (#7953): The 4-wire SNBU Coupler requires two telephone calls. It provides Full Duplex communication as if the Modem was operating in leased line mode (i.e. 14,400/12,000/9600 bps). Available in Canada, France, Italy, UK. Limitation: Model 2 and 3 only.

MACHINES

MODEL CONVERSION

Consult your Communication Marketing support.

ACCESSORIES

These items are purchase-only and must be ordered separately from the modem. Order the appropriate part number via Parts and Supplies Requisition.

Tailing Attachment Cable (P/N 8547438): Attaches a 5866 mdl 2 or mdl 3 to a 5866 mdl 3.

Rack Mount Shelf (P/N 8547412): A rack adapter that fastens inside a standard 19 inch EIA rack. The adapter, which fits racks that have a depth of 60cm (23.6 in.) to 76cm (30 in.) and an opening of 45cm (17.7 in.) will hold two Stand-Alone modems side-by-side.

SUPPLIES (NONE)

Ordering instructions: Order via standard AAS ordering.

5868 RACK MOUNTED MODEM

PURPOSE

The 5868 modem packs are rack-mounted versions of the base 5865 and 5866 modems to be inserted in a 3866 multimodem enclosure. They enhance the user capability for easy installation, maintenance, and expansion of a user's telecommunication network by offering a minimum space requirement.

MODELS

Model 51 051: 9600 bps modem pack operating in synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities at speeds of 9600/7200 bps. Operates in point-to-point, multipoint control, or multipoint tributary mode.

Model 52 052: 9600 bps modem pack operating in synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities at speeds of 9600/7200 bps. Operates in point-to-point, multipoint control, or multipoint tributary mode. Supports enhanced Link Problem Determination Aid (LPDA-2).

Model 61 061: 14,400 bps modem pack operating in synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities at speeds of 14,400/12,000 bps. Operates in point-to-point, multipoint control, or multipoint tributary mode.

Model 62 062: 14,400 bps modem pack operating in synchronous data transmission in half-duplex or duplex mode over 4-wire non-switched duplex facilities at speeds of 14,400/12,000 bps. Operates in point-to-point, multipoint control, or multipoint tributary mode. Can be set to operate in 5865 mode (9600 bps modem). Supports enhanced Link Problem Determination Aid (LPDA-2).

Prerequisites: A 3866 model 1 or 2 with available modem pack slots. Also required is an IBM 5869 Portable Keypad/Display.

It is MANDATORY that all 3866 enclosures have the air deflector plate, P/N 6163020, installed to prevent overheating of the modems. If this plate is not installed, the customer must order the no-charge P/N 6496163, that consists of the plate plus the installation documentation.

This deflector has been installed on all enclosures manufactured after October 1984. If the 3866 serial number is below 53-00279, then P/N 6496163 must be ordered from IBM and installed before any 5868 modems are installed in the 3866 enclosure.

Limitations: These modems use a communication algorithm that allows a 5868-51/52 to communicate to another 5868-51/52, a 5865, and a 5866 or 5868-62 operating in 5865 mode. The 5868-61/62 will only communicate with another 5868-61/62 or a 5866 modem.

The 5868 Model 62 modem can be set through the configuration procedure to normally operate in 5866 mode of 14,400/12,000 bps or, for migration purpose, the modem can be set to operate exactly like a 5865 at 9600/7200 bps. See "IBM 5868 Modem Setup Instructions", GA33-0024 and the "IBM 5868 Modems User's Guide", GA33-0041.

Customer Setup (CSU): This provides the customer with early availability. Also, this allows relocation of the unit without requiring IBM service personnel assistance.

There are no customer accessible setup switches because these functions are selected from the 5869 Portable Keypad/Display (PKD) panel. This enhances adaptability of the modem.

A modem may be configured for point-to-point, multipoint control or multipoint tributary operation from either the local or the control panel. Note: Some changes of the configuration may require SYSGEN changes in the program support. See GI section, "Customer Setup".

In countries where Customer Setup is prohibited or impractical, terms and conditions will include CE support for installation. Con-

tact your country headquarters to find out if Customer Setup applies.

HIGHLIGHTS

- A microprocessor for signal processing.
- Automatic Remote Speed Selection: The transmission speed of each remote Modem can be changed from the central site Modem (this function will not work in CCITT mode). Receiving modems follow the speed of the transmitting modem.
- Anti-Streaming: A multipoint tributary modem can automatically cut off transmission if a terminal holds "Request to Send" up longer than 20 seconds (an abnormal condition in IBM communication protocol). This is a Customer selectable option from the Keypad/Display panel.
- Automatic and Adaptive Equalization: Equalization is automatically performed by the modem and continues to adapt while in data mode.
- Operator Portable Keypad/Display, 5869 or PKD, has a 16-character alphanumeric display for informational messages plus a 20-key input keypad panel. In addition, there are indicators that continuously show the status of certain parameters, such as line condition and operate mode. Simply by unplugging the PKD cord from the front of one pack and plugging it into another pack, this unit can be shared among several modems at the same site.

It is recommended that there be at least two PKDs at every 5868/3866 site for problem determination and modem customization. In case a PKD fails, there will be at least one back-up PKD. At a larger installation, the recommendation is one per enclosure.

- Modem provides its own clocking or will accept DTE (external) clocking or can use its receive clocking.
- The modem diagnostic functions, referred to as Link Problem Determination Aid (LPDA), operate with Systems Network Architecture (SNA) and associated program products. Under control of these programs, the modem accepts commands and initiates tests that help isolate problems to the line, local or remote modem, or elsewhere in the network and provides the NPDA operator with the most probable cause of network problems.

Built-In Diagnostics: All modems will respond to diagnostic commands from an attached 5869 PKD, from the control modem on a link, or from the systems Network Problem Determination Aid, NPDA, operator to help provide status of any modem on the link, its attached terminal, and the quality and level of the received signal over the communication facility. Test requests and responses utilize the same data path and controls that are used for data transmission. Thus, diagnostic status/test requests can be interspersed with data requests without interrupting terminal sessions.

System Diagnostics: On S/370, 30XX, 43XX, and 937X the IBM NetView Program Product or the previous IBM NCCF and NPDA Program Products are required to support IBM's Communications Network Management:

NetView Command Facility (NCCF): Application interface program permitting the network operator to remotely control and test the modem-line-modem complex.

NetView Hardware Monitor (NPDA): Collects, processes and displays both summary and detailed level information for determining probable causes of network errors. Probable cause differentiates among errors in an IBM Communication or Network Controller, lines, Modems, modem interfaces, or Terminals.

It provides alert messages and displays formatted modem test results for all LPDA Modems, including those Modems up-

stream and downstream of the 3720 or the 3710 (in LPDA 1 mode only).

The following program products at the stated level or subsequent levels, unless otherwise specified, may be used:

- For LPDA-2 and LPDA-1 support:
 - ACF/NCP Version 4 Release 2 for 3725 and 3720
 - NetView
 - ACF/VTAM Version 3 Release 1.1
- For LPDA-1 support only:
 - Network Problem Determination Application (NPDA) Version 3 Release 2.
 - Network Communication Control Facility (NCCF) Version 2 Release 2.
 - ACF/NCP Version 3 for 3705, 3720, and 3725.
 - ACF/VTAM Version 2 R2.

LPDA 1 functions require a 3705, 3725, 3720 3710, S/36 or a 8100. LPDA 2 functions require a 3725 at Microcode EC Level 873055 (Field mandatory, available July 31, 1986) or at Release 4 level or a 3720. LPDA 2 can only operate on links running in SDLC or BSC (EBCDIC, ASCII or TRANSPARENT) mode. LPDA 2 does not use the #18 lead of the DTE interface.

System 36 supports the modems at LPDA 1 level with SSP version 4

The 8100 systems will support these new modems with a subset of LPDA 1 using either DPCX or DPPX at the stated levels or subsequent levels, unless otherwise specified:

DPPX/SP02
DPCX/Release 5 with PTF PUC03225

When the 'testlink' command is issued to obtain LPDA reports from a Data Link Attached modem, the results must be interpreted according to the following guidelines:

- DPCX/DPPX - The modem type field in the REMOTE MODEM TEST RESULTS screen is inaccurate.
- DPCX - Test failures involving the Basic card in the modem are reported as Front End ('FE') card failures.
- DPCX - Modem operation at backup speed is reported as 'HALF' speed on the LINK STATUS AND RESULTS screen.

Manual Diagnostics: In addition, tests can also be executed from the modem operator panel. These manual tests include:

- Local self-test -- this includes an extensive test of modem microcode, plus a data wrap with reduced thresholds for received data.
- Remote self-test -- this includes an extensive test of modem microcode.
- Analog test (Line analysis) -- displays telephone line parameters.
- Local loop-back test -- provides a CCITT Loop 3 test.
- Local status -- displays status of local modem.
- Remote status -- displays status of remote addressed modem.
- Digital test (Transmit/receive) -- allows loop test with remote addressed modem.

Extended Diagnostic: This optional feature on the 386X modems, is a standard 5868 function that enhances the diagnostic capabilities of the modems. It provides an additional facility that enables NPDA to differentiate between modem failures, line failures and remote modem power loss.

Customer assistance: Customers experiencing CSU/CPAR difficulties can get telephone assistance from a customer assistance group for modems. Customers whose machine is covered by Warranty or Maintenance Agreement may get assistance by calling the S/ECC (Service/Exchange Communication Center toll free number 800-428-2569) and requesting assistance. The assistance group will then call the customer. This assistance is provided at no additional charge.

On-Site Assistance: If a customer desires on-site assistance to perform problem determination, the customer may call the market-

ing representative to arrange for IBM on-site assistance. IBM will assist the customer on-site in performing problem determination procedures using the same documentation that is available to the customer. On-site assistance is provided at the applicable IBM hourly service rate and minimum charges.

COMMUNICATIONS FACILITIES

PTT Facilities: Telecommunications lines according to CCITT recommendation M1020 or M1025 may be used. See your country TP coordinator for the availability of such facilities in your country. UK Note: British Telecommunications Schedule "B" nonswitched lines can be used.

Privately-owned Communication Facilities: Equivalent to above.

International Facilities: Request your TP coordinator to contact TP coordinators of the other countries involved to determine the availability of such facilities.

Transmission of data between the United States and Canada is supported. The channel in Canada must be schedule 4, type 4.

Related Equipment: The 5868-51 or 52 modem operates with IBM communication products capable of 9600 bps operation.

The 5868-61 or 62 modem operates with IBM communication products capable of 14,400 bps operation. See M2700 pages. In the 5865 mode, the 5868-62 modem operates with IBM communication products capable of 9600 bps operation. The interconnecting cable between the business machine and the modem must be supplied by the business machine. Note: The LPDA functions of the 5868 modems will not operate when the 3845 or 3846 Data Encryption Devices are used to encrypt data over the communication line.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "IBM 5865, 5866 and 5868 Modems Description and Planning Guide", GA33-0057.

The customer is also responsible for:

- Verifying that there is available space in a 3866 Enclosure.
- Verifying that the 3866 air deflection plate is properly installed before installing any 5868 modems.
- Ensuring there is a working Portable Keypad/Display, 5869, at the site for customization and problem determination.
- The connected terminal supports the maximum speed of the modem.
- Arrangements for price quotations, installation, and all costs of common carrier equipment and services.
- Private line (nonswitched) channel -- arranging for the telecommunications service supplier to provide a voice-grade data channel. Also, arranging for the installation of the appropriate receptacle described in "Attachment to Facilities".
- Ensuring the availability of the interconnecting cable between the business machine and the modem because it must be supplied by the business machine.
- Unpacking and placing of the unit. Physical setup, and connection of cables at setup time. During the physical setup, the configuration routine must be executed from the PKD and must be reviewed to ensure compatibility with the actual application. (Example: Point-to-point primary or secondary; multipoint control or tributary.) Details are in the "IBM 5868 Modem Setup Instructions", GA33-0024, and the "IBM 5868 Modem User's Guide", GA33-0041.
- Performing Problem Analysis and Resolution.

Bibliography: See "KWIC Index", G320-1621, or specific systems bibliography.

MACHINES

SPECIFY

● **Language Groups:**

The 3-digit country code is used to select the language which meets the requirements of the country (available languages are: English, French, Japanese and Spanish). No specify code is required, except in Canada:

English #2924
French #2928

Telecommunications Cable (modem to telecommunications line connection): 7.5m (25 ft) (no specify code required). Special cable for custom installation, unterminated (no plug), 0.7m (2.5 ft), specify #9719.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS

Consult your Communication Marketing Support.

ACCESSORIES (NONE)

SUPPLIES (NONE)

Ordering Instructions: Order via standard AAS ordering.

5869 PORTABLE KEYPAD DISPLAY**PURPOSE**

The 5869 Portable Keypad Display (PKD) is the operator control panel for the 5868 rack-mounted modems. This unit is the interface between these modems and the operator. The keypad allows the operator to key in commands to the modem and the responses are displayed on the display panel. This unit is mandatory at every 5868/3866 site.

MODELS**Model 1 001**

Prerequisites: A 5868 mdl 51, 52, 61 or 62 rack-mounted modem.

Limitations: Only one PKD can be connected to a 5868 modem at one time.

HIGHLIGHTS

The 5869 panel has a 16-character alphanumeric display for messages, plus a 20-key input keypad panel. In addition, there are indicators that continuously show the status of certain parameters, such as line condition and operate mode. This unit can be shared among several modem packs at the same site, simply by unplugging the PKD cord from the front of one 5868 pack and plugging it into another pack. It is recommended that there be at least two PKDs at every 5868/3866 site for problem determination and modem customization. The total number of PKDs at a site depends on the number of 5868 modems and the quality of the lines. As a guideline, there should be one PKD per six 5868 modems with a minimum of two PKDs per site.

Related Equipment: The PKD must be connected to a 5868-51, -52, -61, or -62 modem.

Customer Responsibilities: Customers must be informed of their responsibilities as detailed in the M2700 pages, and in the site preparation section of the "IBM 5865, 5866 and 5868 Modems Description and Planning Guide", GA33-0057.

Bibliography: See "KWIC Index", G320-1621, or specific systems bibliography.

SPECIFY

● **Language Groups:**

The 3-digit country code is used to select the language which meets the requirements of the country (available languages are: English, French, Japanese and Spanish). No specify code is required, except in Canada:

English #2924
French #2928

SPECIAL FEATURES (NONE)**MODEL CONVERSIONS**

Consult your Communication Marketing support.

ACCESSORIES (NONE)**SUPPLIES (NONE)**

Ordering Instructions: Order via standard AAS ordering.

6126 CORRECTING RIGHT-TO-LEFT TYPEWRITER**PURPOSE**

Any organization with right-to-left typing requirements can have the proven efficiency of the 6126 typewriter. It tabs and spaces the way Farsi, Hebrew, and Arabic are written.

MODELS**MODEL 856****Dimensions**

Width: 520 mm (20.5 in.)
Depth: 396 mm (15.6 in.)
Height: 177 mm (7.0 in.)
Weight: 17 kg (38 lbs.)

HIGHLIGHTS

- Types the way the language is written, from right to left, and corrects errors at the time they are made.

SPECIFY

- Power

50Hz	60Hz
100V #E048	100V #E049
115V #E005	115V #E001
220V #E028	230V #E003
230V #E006	
240V #E023	
110/220V #E031 *	
220/110V #E032 *	
220/120V #E029 *	

* France (Bi-Voltage)

- Keyboard Group:

Language	Code
Arabic	#K481
Farsi	#K441
Hebrew	#K480
Maghreb	#K551

- Color: Raven Black (#C030)
- Paper Feeds (1, 1-1/2, 2):

48-Tooth #0083
51-Tooth #0085
54-Tooth #0070

SPECIAL FEATURES (None)

MODEL CONVERSIONS (None)

ACCESSORIES (None)

SUPPLIES

See your Country DP Supplies Coordinator.

6128 MEMORY 100 TYPEWRITER
PURPOSE

The 6128 Memory Typewriter has a built-in action file that enables storage of typed material. A dial on the keyboard gives access to the action file. The operator can store and recall up to 100 pages of typed material. By employing the memory capability, the operator can make revisions in typed documents with a minimum of retyping.

MODELS

Model 575 Maximum Operating Speed: 15.5 cps

Dimensions:

Width: 679.5mm (26.75 in.)
Depth: 457.2mm (18 in.)
Height: 190.5mm (7.5 in.)
Weight: 29.25kg (65 lbs.)

HIGHLIGHTS

- Copy correction capability speeds original typing.
- 4,000-character (1-page) memory simplifies complex typing tasks and revision.
- 100-page storage eliminates repetitive typing.
- Dual pitch.
- Standard Features are as follows:
 - Automatic Decimal Tabulation: Allows entry of nonaligned numerals in random length numeric fields. On payout, the logic behind an encoded decimal tab causes alignment of the numerals on their decimal points.
 - Acoustical Filter Hood: A plastic hood placed over the filter which greatly reduces the sound of the machine as it operates.
 - Automatic End-of-Ribbon Shutoff: A sensor incorporated into the ribbon mechanism helps prevent accidental payout of text when the ribbon end is reached. The ribbon end condition is sensed when there are from 50 to 700 character print positions left on the ribbon.
 - Automatic Paragraph Indent: Handles indented formats in adjusted playback. 14 levels of indentation are standard.
 - Automatic Word Underscore: Eliminates time-consuming character-by-character underscoring. Allows the operator to underscore a complete word with only one recorded code. This helps to increase throughput speed and conserve space in the buffer.
 - Automatic Centering: Allows automatic centering, even on first draft.
 - Interchangeability of Type Style Elements: Interchangeable elements can be snapped on and off to give a new, fresh appearance to correspondence.
 - Selective Ribbon System: Designed to accept two types of ribbon systems: IBM High Yield Correctable Film Ribbon and IBM Tech III Ribbon System.
 - Electronic Right Margin and Tabs.

SPECIFY

- Power:

50 Hz	60 Hz
100V #E018	100V #E041
110/220V #E031	115V #E001
112.5V #E034	220V #E030
123.5V #E035	
200V #E014	
220V #E028	
220/110V #E032	
240V #E023	
- Keyboard (88 characters unless otherwise specified):

Country	Code
Brazil	#K971
Canada (French/English)	#K493
France	#K983
Japan	#K698

Japan - Katakana
Latin America
United Kingdom
United Kingdom
• 96 Character

#K699
#K948
#K804 •
#K984

- Color: Black
(no specify required).

SPECIAL FEATURES
Pin Feed Platen:

48-tooth ratchet #0101
54-tooth ratched #0102
24-tooth ratched #0103

Roll Paper Holder (#2480)
Security Lock Key (#8775)

Note: Effective January 1, 1983, features will be subject to availability and limited to field installation.

TERMS and CONDITIONS

Purchase only

MODEL CONVERSIONS None

ACCESSORIES (None)

SUPPLIES

6150 SYSTEM UNIT

PURPOSE

The RT PC System is a microprocessor-based workstation-oriented system that offers a multi-user, multi-tasking operating system with an ease-of-use interface to system services. Program languages for both engineering/scientific and general purpose application development are supported. The RT PC also provides virtual machine support and hardware assisted virtual memory management. The RT PC can operate effectively in both host and workstation environments. The RT PC is designed to satisfy computing needs typical of general business and administrative, academic, engineering and scientific, and office environments, with discipline-specific as well as personal productivity applications. The capability of any model to attach high-resolution 5081 displays also makes it attractive in environments such as technical publishing, document preparation, graphics design, multi-tasking, and CAD/CAM. With the optional IBM Personal Computer AT Coprocessor and appropriate software, many IBM Personal Computer AT programs can also be run on the RT PC System.

MODELS

Model 020: System Unit, 1MB Memory, 40MB Fixed Disk Drive, Fixed-Disk and Diskette Adapter, High Capacity (1.2MB) Diskette Drive, Integrated Date/Time Clock, Keylock, two Asynchronous (RS-232-C) Serial Ports with direct memory access.

Model 025: System Unit, 2MB Memory, 70MB Fixed Disk Drive, Fixed-Disk and Diskette Adapter, High Capacity (1.2MB) Diskette Drive, Integrated Date/Time Clock, Keylock, two Asynchronous (RS-232-C) Serial Ports with direct memory access.

Model A25: Same as Mdl 025.

Model 125: System Unit, Advanced Processor Card with 100 nsec processor and memory management unit, built-in 20M Hz floating-point unit, and 4MB of fast memory; 70MB Extended ESDI Fixed-Disk Drive, Extended ESDI Magnetic Media Adapter, High capacity (1.2MB) Diskette Drive, Integrated Date/Time Clock, Keylock, two Asynchronous RS-232-C Serial Ports with direct memory access (DMA).

Model B25: Same as Model 125.

Prerequisites: The RT PC requires a supported video display adapter and monitor for display output. Attachment of one of the following options will satisfy this prerequisite:

- An IBM 6153 Advanced Monochrome Graphics Display and the IBM RT PC Advanced Monochrome Graphics Display Adapter (#4765).
- An IBM 6154 Advanced Color Graphics Display and the IBM RT PC Advanced Color Graphics Display Adapter (#4766).
- An IBM 6155 Extended Monochrome Graphics Display and the IBM RT PC Extended Monochrome Graphics Display Adapter (#4768).
- An IBM 5151 Personal Computer Display and either the IBM Monochrome Display and Printer Adapter (#4900) or the IBM PC Enhanced Graphics Adapter (#1250) (P/N 1501250) Supports national language characters contained in the base PO code page (PC code page 437) only.
- An IBM 5154 Personal Computer Enhanced Color Display (#4001) and the IBM PC Enhanced Graphics Adapter (#1250) Supports national language characters contained in the base PO code page (PC code page 437) only.

Minimum Configuration: Minimum recommended configuration for both warranty and post-warranty service is System Unit, Keyboard, and one supported display. (Note: The 5080 Graphics Display System does not fulfill the requirement for a system console).

Customer Setup (CSU): All models of the RT PC are customer setup.

HIGHLIGHTS

- The 6150 utilizes a desk-top display and keyboard with a floor standing base unit which fits under a standard height desk and houses the processor, memory, the internal media, and the required adapters.
- The 6150 initial series of models (020,025,A25) contains a memory card with error correcting code (ECC) (1MB in the Mdl 020, 2MB in the mdls 025 and A25) and a slot for an optional additional memory card, which can either be 1MB, 2MB, or 4MB card. The 6150 new series models (125 and B25) come equipped with a standard 4MB of fast memory on the Advanced Processor Card. Two memory slots in the system unit are available for optional additional memory cards, which may be either 4MB or 8MB Fast Memory cards, up to a total of 12MB of additional memory. Mdl 020 maximum memory is 5MB (8MB with replacement of standard mdl 020 1MB Memory Card), mdl 025/A25 maximum memory is 6MB (8MB with replacement of the standard mdl 025 2MB Memory Card). Maximum memory for Models 125 and B25 is 16MB of Fast Memory, including the 4MB Fast Memory on the Advanced Processor Card.
- The 6150 contains one fixed-disk drive (40MB in Mdl 020, 70MB in Mdls 025, 125, A25, and B25) and space and power for up to two additional optional fixed-disk drives, which can be either 40MB or 70MB drives in models 020, 025, or A25, or 70MB drives in Models 125 and B25 (maximum storage 210MB).
- The 6150 contains one High-Capacity (1.2MB) Diskette Drive and a slot for an additional diskette drive, which may be either a High-Capacity Drive or a Dual-Sided Drive (320/360KB).
- The 6150 contains eight feature slots. These slots allow addition of optional feature cards to support additional devices, features or memory. Six of these slots are full feature slots that will accept 16-bit feature cards. The remaining two are specialized slots that will only accept 8-bit I/O feature cards.
- The following features are standard with the 6150:
 - National Language keyboard (102 characters) may be specified.
 - Eight system feature slots (one is used for a display adapter and one for a disk/diskette adapter).
 - IBM-developed full 32-bit microprocessor with 170 nsec processor cycle time - (Models 020, 025, A25)
 - IBM-developed full 32-bit microprocessor with 100 nsec processor cycle time (Models 125 and B25)
 - IBM-developed 40-bit virtual memory management unit.
 - Hardware page-level storage protect.
 - 435 watt (peak) power supply (Mdl 025, 125, A25, B25).
 - Adapter for second and third fixed-disk drive and second diskette drive (Models 125, B25)
 - Adapter for second fixed-disk drive and second diskette drive. (Models 020, 025, A25)
 - Programmable speaker which can be used to produce tones.
 - System clock/calendar with CMOS RAM and battery backup.
 - Two asynchronous (RS-232-C) serial ports with direct memory access. (Recommended for attachment of high data rate devices such as the IBM Pageprinter 3812).
 - A slot for the optional Floating-Point Accelerator, or Advanced Floating-Point Accelerator
 - 24-bit addressing, 16-bit data path on I/O bus.
 - Dedicated port for attaching optional Mouse or Tablet.
 - User lockable security keylock which can help to prevent removal of cover, initialization of system, and entry of command/date from keyboard.

- The 6150 Model 020 contains a PC AT Fixed-Disk and Diskette Adapter, which can support up to two 40MB Fixed-Disks and up to two diskette drives. Additional adapters are available as an optional feature (P/N 6080428). The 6150 Models 025 and A25 each contain one ESDI Magnetic Media Adapter, which can support up to two 70MB ESDI Fixed-Disks and up to two diskette drives. Additional adapters are available as an optional feature (P/N 61X6341). The 6150 Models 125 and B25 each contain one Extended ESDI Magnetic Media Adapter, which can support up to three 70MB Extended ESDI Fixed-Disks and up to two diskette drives (Each of the three kinds of adapters supports a specific kind of fixed-disk drive only).
- Dimensions (approximate):
 - Height - 635mm (25 in.)
 - Width - 210mm (8.3 in.)
 - Depth - 614mm (24.2 in.)
 - Weight - 38kg (84 lbs.)
- Some of the new options available for the 6150 include:
 - 1MB Memory Expansion
 - 2MB Memory Expansion
 - 4MB Memory Expansion
 - S/370 Host Interface Adapter
 - Small Computer System Interface Adapter
 - ESDI Magnetic Media Adapter
 - Floating-Point Accelerator
 - 40MB Fixed-Disk Drive
 - 70MB Fixed-Disk Drive
 - Personal Computer AT Co-processor Card
 - Personal Computer AT Fixed-Disk and Diskette Drive Adapter
 - Advanced Monochrome Graphics Display Adapter
 - Extended Monochrome Graphics Display Adapter
 - Advanced Color Graphics Display Adapter
 - Streaming Tape Drive Adapter
 - Mouse
 - 4-Port Asynchronous RS-232-C Adapter (Buffered)
 - 4-Port Asynchronous RS-422-A Adapter (Buffered)
 - 5080 Peripheral Adapter
 - 5080 Attachment Adapter
 - 4MB Fast Memory Expansion (Models 125 and B25 only)
 - 8MB Fast Memory Expansion (Models 125 and B25 only)
 - Advanced Floating-Point Accelerator
 - 70MB Extended ESDI Fixed-Disk Drive
 - Megapal Display Adapter
 - Token Ring Network Adapter
 - Multiprotocol Communications Adapter
 - Baseband Adapter
 - New Model Series Upgrade Kit (Models 020, 025 and A25 only)
 - 114MB Extended ESDI Fixed Disk Drive

The following currently available options, features, and IBM peripheral devices are supported on the 6150:

- IBM 5151 Personal Computer Display
- IBM Monochrome Display and Printer Adapter (P/N 1504900)
- IBM 5154 Personal Computer Enhanced Color Display
- IBM PC Enhanced Graphics Adapter (P/N 1501200)
- IBM Personal Computer AT High Capacity Diskette Drive (P/N 6450206)
- IBM Personal Computer AT Dual-Sided Diskette Drive (P/N 6450207)
- IBM PC Graphics Memory Expansion Card (P/N 1501201)
- IBM PC Graphics Memory Expansion Kit (P/N 1501203)
- IBM Personal Computer AT Math Co-processor (P/N 6450211)
- IBM Personal Computer AT 512KB Memory Expansion Option (P/N 6450203)
- IBM Personal Computer AT Serial/Parallel Adapter (P/N 6450215)
- IBM Personal Computer 3278/9 Emulation Adapter (No longer available) (P/N 6487844)
- IBM PC Network Adapter (P/N 6450213)
- Lighted Program Function Keyboard (P/N 6246799)
- Dials (P/N 6248436)
- IBM 5083 Tablet Models 11 and 12 (No longer available)
- IBM PC Advanced 3278/79 Emulation Adapter (P/N 8665789)
- IBM 5083 Tablet Models 11A and 12A
- IBM 3852 Model 2 Colorjet Printer
- IBM 4202 Proprinter XL
- IBM 5081 Display Models 11, 12, 16, and 19
- IBM 5842 Modem
- IBM 6184 Color Plotter
- IBM 9332 DASD Models 240, 250, 440 and 450
- IBM 9309 Rack Enclosure Models 1 and 2
- IBM 5201 QUIETWRITER Printer, Mdl 1 and 2 (Mdl 2 supported in character mode and IBM 5152 compatible graphics mode only).
- IBM 4201 Proprinter
- IBM 5152 Graphics Printer (Withdrawn from marketing by IBM)
- IBM 5182 Color Printer (Withdrawn from marketing by IBM)
- IBM 6157 Streaming Tape Drive
- IBM 7371 Color Plotter
- IBM 7372 Color Plotter
- IBM 7374 Color Plotter
- IBM 7375 Color Plotter Mdl 1 and 2
- ASCII Workstations:
 - IBM 3161 ASCII Display Station (and IBM 3163 in 3161 mode).
 - IBM PCs (IBM PC, IBM PC XT, and IBM Personal Computer AT) with Asynch cards and emulation software.
 - ASCII terminals that adhere to ANSI 3.64 protocol as implemented by DEC VT100* and DEC VT220* or equivalent.
 - Support is limited to US 7-bit ASCII characters.
- IBM Personal Computer AT Communications Cable (P/N 6450217)
- IBM Personal Computer AT Serial Adapter Connector Cable (P/N 6450242)
- IBM Personal Computer Printer Cable (P/N 1525612)
- IBM Personal Computer Printer Stand (P/N 1525614)

* VT-100 and VT-220 are Registered Trademarks of Digital Equipment Corporation.

Publications

- IBM RT PC Concepts (GC23-0784): Provides a high-level overview of the IBM RT PC hardware, AIX Operating System, and its management applications and supporting publications.
- IBM RT PC Guide to Operations (SV21-8021): Describes procedures for operating the hardware, including the system unit, the display, the keyboard, and other IBM devices which can be attached.
- IBM RT PC User Setup Guide (SV21-8020): Describes how to set up and cable together the system components which IBM supplies. Also describes how to install optional adapters, cards, and drives in the System Unit.
- IBM RT PC Problem Determination Guide (SV21-8022): Describes how to locate, identify, and correct problems with the system. Also shows how to run hardware diagnostic utilities to gather information on software problems. Includes a high capacity (1.2MB) diskette containing the diagnostic routines.
- IBM RT PC Mdl 020 and Mdl 025 Hardware Maintenance and Service (SV21-8025): Contains information and procedures to enable maintenance service personnel to isolate and repair a malfunction in the 6150 system unit.
- IBM RT PC Hardware Technical Reference (SV21-8024): This manual is designed to provide hardware design and interface information for engineers and programmers involved in the design of hardware or software to interface to the RT PC.
- IBM RT PC Planning Guide (GC23-0782): Provides a system overview as well as the physical specifications of components; power, cable, lighting surge protection and environmental requirements; and customer responsibilities.

SPECIFY

- Voltage/Line Cord/Publications Language will automatically be supplied, based on the country code of the order and specify feature codes are not normally required. Only specify the feature codes below on an exceptional basis, when an alternative to the country default is required.
- (Except Canada> Voltage and Line Cord: Country default voltage and matching line cord are automatically supplied

based on country code of order. List of countries below shows country defaults for line cord (part number) and voltage.

For voltage and matching line cord other than default value, call Plant of Control (Vimercate) Order Department.

- High Voltage: 220V AC (180-259V), 50/60 Hz, IEC 380/435, EIF Safety Mark.
- Low Voltage: 110V AC (90-137V), 50/60 Hz, UL/CSA Safety Mark.

Item No.	Country	Voltage Default
1838574	Thailand (856)	High Voltage
6952300	Bahamas (619), Barbados (621), Bermuda (627), Bolivia (629), Canada (649), Colombia (661), Costa Rica (663), Dominican Republic (681), Ecuador (683), El Salvador (829), Guatemala (731), Guyana (640), Honduras (735), Jamaica (759), Japan (760), Netherlands Antilles (791), Panama (811), Surinam (843), Taiwan (858), Trinidad (859), Venezuela (871),	Low Voltage
6952311	Argentina (613), Australia (616), New Zealand (796),	High Voltage
6952320	Indonesia (749)	High Voltage
6952356	Hong Kong (738), Singapore (834), Malaysia (778)	High Voltage
6952374	Chile (655)	High Voltage

- Publications Language Group: No specify code is required. Country default language will automatically be supplied if no language is specified (see Country Language Defaults listed below).

Specify Code	Language
0073	Japanese
0060	Spanish

- The Country Defaults for publications language are as follows:

Country	Language
Japan	Japanese
All other countries	English US<)

(Canada only>Orders for a 6150 models A24, B25 should specify the appropriate system unit part numbers as well as a 5080 attachment adapter (P/N 6247860), line-cord (P/N 6952300), H.M.S. manual (P/N 74X9951) and the documentation ship group (P/N 75X1023). A special keyboard is provided with the 5080 Graphics Systems and therefore keyboards should not be specified with 6150 model A24 and B24 orders.

In addition, the Options documentation ship group (P/N 75X1105), available in July 1987, is required for the following products:

Description	P/N
6151 Model 115	79X3944
6150 Model 125 or B25	79X3928
Megapel Display Adapter	6247658
4MB Fast Memory	61X7004
8MB Fast Memory	61X7008
70MB Ext. ESDI Disk Drive	79X3988
Small Computer Systems	
Interface Adapter	61X7000
SCSI Adapter Cable	79X3468
SCSI Device to Device Cable	79X3470
New Model Series Upgrade Kit	61X6833
Enhanced Floating Point	
Accelerator	61X6815
Token Ring Network Adapter	69X8142*

Host Interface Adapter	6247893*
DCA/TCA 3278/79 Adapter	8665789*

* An Interim Options documentation ship group (P/N 75X1063) will be available in April 1987 for the Token Ring Network Adapter, the Host Interface Adapter and the DCA/TCA 3278/79 Adapter. Orders for these adapters after June 1987, however, should specify P/N 75X1105 for the options documentation ship group.

Low Voltage: 110V AC (90-137V), 50/60 Hz, UL/CSA Safety Mark. <)

SPECIAL FEATURES

Keyboard: Provides a 102-key keyboard for use with the 6150. Keyboard may be connected to the RT PC System Unit by an attached 2.5m (8.2 ft) cable provided with keyboard, permitting a variety of workspace configurations. Keyboard has 102 keys, 30 mm height, and adjustable tilt. Commonly used data and word processing functions are provided, along with separate typewriter and numeric keypads. Cursor keys, arranged in an inverted "T" pattern, are independent of numeric keys. Key-location enhancements and Light-Emitting Diode (LED) mode indicators (Cap Lock, Insert Mode, Scroll Lock) improve keyboard usability. Special symbols may be accessed with a combination of keys. Twelve National Language Keyboards are available. Order desired National Language keyboard from list below:

Keyboard Language:

Feat. Code	Language Keyboard
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(Except Canada>	
1258	English UK
1256	English US
1264	French
1257	German
1260	Spanish
1268	Italian
1267	Swedish/

	Finnish
1266	Norwegian
1271	Belgian
	French/Dutch
1254	Swiss
	French/German
1265	Danish
1259	Portuguese<

(Canada only>

P/N Language Keyboard

1392366	English US
1382373	Canadian/French<

Limitation: Only one keyboard may be attached to the 6150 System Unit at one time. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Computer AT 512KB Memory Expansion (P/N 6450203): Adds 512KB memory on the I/O bus. Memory is accessible by either 6150 Processor or Personal Computer AT Co-processor Option, but is primarily used to support higher performance of the Co-processor. Memory address segment is switch selectable. Packaged as a circuit card to plug into a 16-bit feature slot in the 6150. Technical Information: Performance characteristics are same as for other Personal Computer AT Memory -- When used with the Co-processor (P/N 6294756) this memory enhances co-processor performance over that of co-processor using 6150 main memory -- 16-bit data path -- Parity byte per error detection. Required for optimal performance of the Co-processor option (P/N 6294756) if system memory is less than 2MB. Maximum: Two. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Computer AT High Capacity Diskette Drive (6450206): Provides a second high capacity (1.2MB) diskette drive (one high capacity drive is standard Drive is half-high, 5-1/4 inch, dual-sided, and uses the new 96-TPI high density media to record up to 1.2MB of data or programs. The 6150 may use this drive to read 4B TPI media from the IBM PCjr, IBM Personal Computer, IBM Personal Computer XT, IBM Portable Personal Computer or IBM Personal Computer AT. The High Capacity Drive can also write on this media. However, once the 48 TPI media has been written in this drive, it may only be readable on another High Capacity Drive. Technical Information: 512 bytes per sector -- 15 sectors per track -- 96 tracks per inch -- 80 tracks per surface -- 360 RPM -- 98 ms average access time in 96 TPI mode -- supports both 300 and 500 K bits/second data transfer rates. Maximum: One (in addition to standard high capacity drive on 6150). Field Installation: Yes. Prerequisites: None (adapter is standard in 6150). Customer Setup: Yes.

IBM Personal Computer AT Dual-Sided Diskette Drive (6450207): Provides a second diskette drive for the 6150 (one High Capacity diskette drive is standard). Attached to 6150 via Disk/Diskette Adapter (standard feature). Allows the 6150 to read and write data on both sides of a soft-sectored 5-1/4 inch diskette. Formatted storage capacity is approximately 320KB (360KB with IBM Personal Computer DOS 2.0). Technical Information: 512 bytes per sector -- 8/9 sectors per track -- 48 tracks per inch -- 40 tracks per surface -- 300 RPM -- 105 ms average access time -- 250K bit per second transfer rate -- 320/360KB storage. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: None.

IBM Personal Computer AT Math Co-processor (P/N 6450211): Provides a numeric processor extension with floating point, extended integer, and BCD data types. When installed with Feature #4756, IBM Personal Computer AT co-processor, the Math Co-processor operation conforms to the Proposed IEEE Floating Point Standard (Version 8.0). Technical Information: 4.0 MHZ clock speed -- protected virtual address mode -- floating point, extended integer, BCD data support. Maximum: One. Field Installation: Yes. Prerequisites: IBM Personal Computer AT Co-processor, #4756. (The Math Co-processor is installed in a socket in the IBM Personal Computer AT Co-processor card.) Customer Setup: Yes.

IBM PC Network Adapter (P/N 6450213): The IBM PC Network Adapter is an option card for connecting the 6150 to the IBM PC Network, with IBM Personal Computers, IBM Personal Computer XTs, IBM Portable Personal Computers or IBM Personal Computer

ATs. Each 6150 requires one IBM PC Network Adapter card, which is supplied with a 3-meter attachment cable. The IBM PC Network Adapter card plugs into either a 8-bit or 16-bit expansion slot. This cable can be connected directly to the IBM PC Network and it's associated translators, expanders and cable kits. Limitation: Customer supplies software is required for proper utilization. Although data from the IBM PC Network Adapter may be received by the 6150 via both programmed I/O operations and Direct Memory Access, data may not be sent to the Adapter via Direct Memory Access. Maximum: One per 6150 System. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Computer AT Serial/Parallel Adapter (P/N 6450215): Provides a parallel port and an RS-232-C serial port. It occupies one feature slot of either the 8-bit or 16-bit types. The serial portion is fully programmable and supports asynchronous communication from 50 to 9,600 bits per second. It offers the same subset of the EIA RS-232-C interface which is provided by the IBM Personal Computer Asynchronous Communications Adapter Card, but on a 9-pin external connector. The parallel portion of the adapter provides the ability to attach various devices that accept 8 bits of parallel data, and provides the equivalent interface to the IBM Personal Computer Printer Adapter Card. Limitation: If the IBM Monochrome Display and Printer Adapter (#4900) (1504900) is installed, two Serial/Parallel Adapters may be installed, but only one of the parallel ports may be used. Maximum: Two. Field Installation: Yes. Customer Setup: Yes.

IBM PC Enhanced Graphics Adapter (P/N 1501200): Provides support for attachment of the 5154 Personal Computer Enhanced Color Display. In addition, it provides enhanced graphics support for the 5151 Monochrome Display. The base option contains 64KB of expandable graphics memory which supports four colors. The option can be inserted in either an 8-bit or 16-bit card slot.

An optional IBM PC Graphics Memory Expansion Card (P/N 1501201) is available to increase memory to 128KB, and increase the color graphics support to 16 colors. A Memory Module Kit (P/N 1501203) increasing memory to 256KB may also be added to this card to support smooth scrolling, panning, and more pages of graphics data. Limitation: Only two display adapters of any kind may be attached to the 6150 System Unit (the two adapters must be different). Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes. Supports national language characters contained in the base PO code page (PC code page 437) only.

IBM RT PC Four-Port Asynchronous RS-232-C Adapter (Buffered) (#1356): (Replaces #4763 (NO LONGER AVAILABLE)). Adapter provides a subset of the EIA RS-232-C interface signals on each of four 10-pin connectors for the independent attachment of ASCII terminals, asynchronous modems, or serial devices like plotters and printers (supports attachment of 3812 PagePrinter and/or the 4201 Proprietary with Serial Attachment #3000). Adapter provides sixteen-byte buffers on both the send and receive paths of each port to facilitate high throughput, and can offer improved performance for systems supporting relatively large numbers of terminals. Maximum data rate supported is 19.2K bps over a 50-foot distance. This adapter may coexist in an RT PC with the RT PC Four-Port Asynchronous RS-422-A Adapter (#4764), the RT PC Four-Port Asynchronous RS-422-A Adapter (Buffered) (#1357), the RT PC Four-Port Asynchronous RS-232-C Adapter (#4763), and the RT PC 5080 Peripheral Adapter (#7561). Each adapter requires an available 16-bit feature slot. Limitation: The total number of these five types of adapters (#4763, #4764, #1356, #1357, and #7561) may not exceed four per RT PC system. Maximum: Four. Field Installation: Yes. Customer Setup: Yes.

IBM RT PC Four-Port Asynchronous RS-422-A Adapter (Buffered) (#1357): (Replaces #4764 (NO LONGER AVAILABLE)). This adapter provides a subset of the EIA RS-422-A interface signals on each of four 6-pin connectors for the independent attachment of ASCII terminals. This adapter provides sixteen-byte buffers on both the send and receive paths of each port to facilitate high throughput, and can offer improved performance for systems supporting relatively large numbers of terminals. The maximum data rate supported is 19.2K bps over a distance up to 4,000 feet. (User-supplied surge suppressor required if distance is greater than 400 feet.) The interface cable should not be installed outdoors. This adapter may coexist in an RT PC with the RT PC Four-Port Asynchronous RS-422-A

Adapter (#4764), the RT PC Four-Post Asynchronous RS-232-C Adapter (#4763), the RT PC Four-Post Asynchronous RS-232-C Adapter (Buffered) (#1356), and the RT PC 5080 Peripheral Adapter (#7561). Each adapter requires an available 16-bit feature slot. Limitations: The total number of these five types of adapters (#4763, #4764, #1356, #1357 and #7561) may not exceed four per 6150 system. Maximum: Four. Field Installation: Yes. Customer Setup: Yes.

4MB Memory Expansion (P/N 61X6156): Increments system memory by 4MB on the 6150 (any model). Packaged on a card which plugs into an additional memory slot in the 6150. Technical Information: Divided into two "arrays" of 2MB each 32-bit data path plus 8-bit ECC. Uses interleaving to overlap memory accesses 170 nsec effective memory card cycle (23.5 megabytes per second). Limitation: 4MB Memory Card must occupy memory slot #1 when used with either 1MB or 2MB Memory Cards. Maximum: One additional. Field Installation: Yes. Prerequisites: An available memory slot in the 6150. Customer Setup: Yes.

IBM RT PC 114MB Extended ESDI Fixed-Disk Drive (#3272): This feature provides a 114MB Fixed-Disk Drive for use as an optional second or third drive in a 6150 Model 125 or B25. The disk is formatted to be compatible with the RT PC Extended ESDI Magnetic Media Adapter which is standard in each RT PC Model 125 and B25. Average access is 28ms, transfer rate is 10M bps. The drive has the same 5-1/4 inch form factor as the existing RT PC System drives, and uses the ESDI interface. The drive operates at 3,600 RPM, and has 35 sectors per track with 512 bytes per sector. This disk drive and the standard RT PC Extended ESDI Magnetic Media Adapter is the new series models (115, 125 and B25) together provide a large performance increase over the RT PC 70MB ESDI Fixed-Disk (#6941) or the 40MB Fixed-Disk Drive through 1:1 sector interleaving and Direct Memory Access (DMA) of disk data. AIX Version 2.1 is a prerequisite for support of the 114MB Extended ESDI Fixed-Disk Drive. (Not available as an optional feature for any model of the 6151. Not available for the 6150 Models 020, 025 or A25.) Maximum: Two. Field Installation: Yes. Prerequisites: An available internal fixed-disk position in a Model 125 or B25. Customer Setup: Yes.

IBM Personal Computer AT Fixed-Disk and Diskette Drive Adapter (P/N 6080428): This Adapter is included as standard in Mdl 020 of the 6150. As the standard adapter plugged into feature slot 1, it provides support for the attachment of up to two 40MB Fixed-Disk Drives (P/N 6294735) (ST506-type interface) and up to two diskettes drives (two PC AT High-Capacity drives or one PC AT High-Capacity Diskette Drive and one PC AT Dual-Sided Diskette Drive). A second adapter is required to attach the third fixed disk drive to the 6150. Requires a 16-bit feature slot. Fixed-disk data rate is 5M bps. Diskette data rates are 250/300/500K bps. Limitations: Supports only the 40MB Fixed-Disk Drives (P/N 6294735). Does not support attachment of the 70MB Fixed-Disk Drive (P/N 61X6941). The first adapter is standard on the Mdl 020 and is factory-installed in feature slot 1. The second adapter may be installed in either feature slot 2 or in feature slot 1 if the existing adapter in slot 1 is first moved to slot 2. Supports only one fixed-disk drive and no diskette drives if plugged into feature slot 2. If adapter in slot 1 and slot 2 are not alike and the standard adapter in slot 1 is moved to slot 2, the fixed-disk drive in drive position 1 must also be moved (to drive position 3). Maximum: Two (one standard and one additional feature). Field Installation: Yes. Prerequisites: Requires an available 16-bit feature slot (either slot 1 or slot 2). IBM RT PC Fixed-Disk Attach Cable (P/N 6298541) also required to attach disk to adapter when plugged into feature slot 2. Customer Setup: Yes.

IBM Token-Ring Network RT PC Adapter (P/N 69X8142): The IBM Token-Ring Network RT PC Adapter provides physical attachment of the IBM 6150 Model 020, 25, A25 and/or 6151 Model 010 to an IBM Token-Ring Network. The network uses the IBM Cabling System, including Type 3 specified telephone media for physical connection and a token-ring access protocol for network traffic control. Detailed information on the IBM Token-Ring Network is provided in the Product Announcement

Highlights:

- Provides connection of the RT PC to the IBM Token-Ring Network.

- Conforms to the IEEE standard 802.5 and ECMA standard 89 for token-ring, baseband local area networks.
- Network intelligence resident in adapter, providing significant network management capability.
- 16K bytes of RAM.
- Selectable DMA levels.
- Burned in addresses.
- Up to two adapters per system.

The IBM Adapter is a feature card for the 6150 Model 020, 025, A25, and 6151 Model 010 System Units. Refer to the announcement letter for additional information.

The adapter contains a microprocessor operating under control of adapter resident microcode. The adapter connects the RT PC to an IBM Token-Ring Network which operates at a speed of four million bits per second using protocols conforming with IEEE 802.5 and ECMA 89 standards.

Significant reliability, availability, and serviceability functions are built into the adapter and microcode. Diagnostics invoked during adapter initialization verify the adapter operation and check-out the cabling to the access unit. The adapter detects permanent errors, such as loss of receive signal, and generates a notification signal to initiate automatic network recovery. Recoverable errors, such as bit errors in the transmitted message, are detected by the adapter for subsequent reporting to a ring diagnostic program.

RT PC diagnostic diskettes contain an advanced diagnostic program for service personnel use in isolating faults to the adapter, the adapter attachment cable, or the remainder of the network.

A ring diagnostic program is used in an IBM Personal computer as an aid in problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented.

A publication is provided with the adapter to aid the user in operation, installation, and problem determination: IBM Token-Ring Network RT PC Technical Reference (SK2T-0291).

An attachment cable is required for connecting the adapter to the network cabling system. The IBM Token-Ring Network RT PC Adapter cable is a 2.4m (8 ft.) attachment cable used to connect the adapter to data grade media. The Type 3 Media Filter includes a 2.4m (8 ft.) cable and is used to connect the adapter to Type 3 telephone media. (See the Product Announcement letter dated 10/15/85).

Publications: The following publication is available through your local IBM branch office: IBM Token-Ring Network RT PC Adapter Installation, Setup and Service. (Contains a detailed description of the adapter operation and programming interfaces.)

The following technical reference manual is available from IBM Direct and can assist vendors in developing hardware and software products for attachment to the IBM Token-Ring Network: IBM Token-Ring Network Architecture Reference (6165877). (Contains a detailed description of the IEEE 802.5 token-ring access protocol and the IEEE 802.2 logical link control as implemented for the IBM Token-Ring Network.)

The Locally Attached Personal Computers (G4000) course has been updated to include information on the IBM Token-Ring Network. The IBM Cabling System Planning (G3644) and IBM Cabling System Layout and Physical Installation (G3648) courses have been updated to include planning and installation information for the multi-station access unit for Type 3 telephone media accessories. Call IBM Direct for course locations and schedules.

Hardware Requirements: An operational token-ring network consists of cabling, access units, and attaching devices. Each attaching device requires a network adapter.

For attachment of a 6150/6151 to the network, the IBM Token-Ring Network RT PC Adapter must be installed in either a 6150 Model 020, 025, or a 6151 Model 010.

The recommended minimum network should consist of at least one IBM Personal Computer with an IBM Token-Ring Network Adapter

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and a ring diagnostic program installed to facilitate Token-Ring Network problem determination.

Software Requirements: This adapter is intended to be used only in an RT PC hardware environment with an AIX(TM) Operating System Version 1.1. In addition, the user must develop or acquire appropriate VRM/AIX software that specifically supports this adapter. An adapter level program supporting the desired function must be available and be down-loaded to the adapter before it can become operational.

(TM) AIX is a trademark of IBM.

Security, Auditability, and Control: User management is responsible for evaluation, selection, and implementation of security features, for administrative procedures, and for appropriate controls in application systems.

Data transmitted on the network passes through each network attaching device adapter. Users may wish to take the added security precaution of encrypting sensitive information before it is transmitted.

IBM RT PC 70MB Extended ESDI Fixed-Disk Drive (P/N 79X3988): This feature provides a 70MB fixed-disk drive for use as an optional second or third fixed-disk drive in a Model 125 or B25. The disk is formatted to be compatible with the Extended ESDI Magnetic Media Adapter and is identical to the 70MB Extended ESDI Fixed-Disk drive which comes as standard with every Model 125 or B25. Average access is 37ms, transfer rate is 10M bits per second. ESDI interface, 512 bytes per sector, 35 sectors per track, 3600 RPM, 5-1/4 inch internal disk drive. This disk drive and the standard Extended ESDI Magnetic Media Adapter in the new series models (115, 125, B25) together provide a performance increase over the 70MB ESDI Fixed-Disk Drive (P/N 61X6941) and its adapter through 1:1 sector interleaving and Direct Memory Access (DMA) of disk data. A software prerequisite is for disk support is AIX Version 2.1. Limitations: Not available for Models 010, 015, 020, 025 and A25. Maximum: Three total (One standard plus up to two additional as optional features). Field Installable: Yes. Prerequisites: None. (Extended ESDI Magnetic Media Adapter which is standard on Models 115, 125 and B25 will support up to three fixed-disks). Customer Setup: Yes.

Lighted Program Function Keyboard (P/N 6246799): Is a compact, 32-key device which may be used to initiate application defined functions with a single keystroke. Amber-colored LEDs imbedded in the keytops are turned on and off by the application to signal to the user which keys may be selected at a given moment. The device is supplied with a 1.1m cable which plugs into the RT PC 5080 Peripherals adapter via an attachment cable kit (P/N 6487564). Cable length total is 2.4m (7.8 ft). The RT PC 5080 Peripheral Adapter supplies DC power to the keyboard. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM RT PC 40MB Fixed-Disk Drive (P/N 6294735): Provides additional disk storage for user programs and data for either Mdl 020 or Mdl 025 and A25. One fixed-disk drive is provided as standard in the 6150 (40MB drive in the Mdl 020, 70MB ESDI Drive on the Mdl 025). Technical Information: ST-506 Interface -- 512 bytes per sector -- 17 sectors per track -- 40MB capacity -- 3600 RPM -- 40 ms average access time -- 5M bps transfer rate. Maximum: Three (one standard and two additional features). Field Installation: Yes. Prerequisites: Requires RT PC Fixed-Disk and Diskette Drive Adapter (P/N 6080428). First additional disk drive attaches to adapter (P/N 6080428) provided as standard in 6150 Mdl 020. Second additional drive requires additional adapter (P/N 6080428) in 6150 Mdl 020 and also Fixed-Disk Attach Cable (P/N 6298541). If 40MB drive is to be added to 6150 Mdl 020 or A25, a Fixed-Disk and Diskette Drive Adapter (P/N 6080428) and cable (P/N 6298541) will be required regardless of whether the 40MB drive is the second or third drive in the Mdl 025. Customer Setup: Yes.

2MB Memory Expansion (P/N 6294739): Increments system memory by 2MB (two million bytes) on 6150 Mdl 020 or 025. Packaged on a card which plugs into memory slot on 6150. Technical Information: Divided into two "arrays" of 1MB -- 256K X 1 DRAM modules -- 32-bit data path plus 8-bit ECC -- uses interleaving to overlap memory accesses -- 170 nsec effective memory cycle (23.5 megabytes/second). Limitation: If a 1MB and a 2MB memory card are used together in

a 6150, the 2MB card must occupy memory slot #1. Maximum: One additional (may also be used to replace the standard 1MB memory card on the Mdl 020 for a total of 4MB). Field Installation: Yes. Prerequisites: An available additional memory slot on the 6150 Processor. Customer Setup: Yes.

Personal Computer AT Co-processor Card (P/N 6294756): Provides for execution of many IBM Personal Computer and IBM Personal Computer AT programs concurrent with and under control of the 6150 main processor. With appropriate program support (the IBM RT PC Personal Computer AT Co-processor Services licensed program, (P/N 55X8903), the option enables the 6150 to emulate the IBM Personal Computer AT Mdl 068 and 099. Performance will be better than that of the IBM PC XT (in general) but less than that of the IBM Personal Computer AT. Application execution is concurrent with 6150 program execution. Technical Information: 3 channel timer/counter -- 16 level interrupt controller -- 6 MHz processor -- expanded diagnostics using 6150 capabilities. Limitations: Must be installed in I/O option slot #8. May be used in conjunction with optional IBM Personal Computer AT Math Co-processor Feature (P/N 6450211) and IBM Personal Computer AT 512KB Memory Expansion Option (P/N 6450203). Requires either 2MB or more of system memory, or IBM Personal Computer AT 512KB Memory Expansion (P/N 6450203) for satisfactory performance. Maximum: One. Field Installation: Yes. Prerequisites: I/O option slot #8, and the Co-processor Services LPP (P/N 55X8903). A dedicated PC display (5151 or 5154) is recommended for improved performance. Customer Setup: Yes. Supports national language characters contained in the base PO code page (PC code page 437) and supported by DOS "KEYBXX" only.

Floating-Point Accelerator (P/N 6294758): Provides circuitry to support both single (32-bit) and double (64-bit) precision floating point operations using 32 sets of 14 registers (32-bits each) provided on the feature. Provides significant performance improvement for floating-point calculations. Supports the format and basic operations defined by the ANSI/IEEE 754-1985 Binary Floating-Point Standard. Circuitry packaged as a card which plugs into a special slot (slot B) on the 6150 system board. Technical Information: Supports add/subtract/multiply/divide/compare -- supports conversion between single and double precision, and between floating point and integer formats -- supports additional operations negate and absolute. Maximum: One. Field Installation: Yes. Prerequisites: The Advanced Interactive Executive Operating System (P/N 55X8994) is required to support the additional IEEE 754 operations and exception handling. Customer Setup: Yes.

IBM RT PC Multi-Protocol Communications Adapter (P/N 6294762): The IBM RT PC Multi-Protocol Communications Adapter is designed as a single-slot (16-bit) multiple adapter for attaching a variety of data communications equipment to the IBM RT PC. The adapter will accommodate three physical interfaces and can be programmed to support a variety of protocols. The adapter contains a high-performance Intel 80C51 microcontroller with 8KB of adapter memory. Also provided are adapter diagnostics, bootstrap loader, and other advanced features.

This adapter can be appropriately programmed to provide the following capabilities:

- Two port concurrency supported on a single adapter
- Two adapter concurrency supported in a single RT PC system (providing up to four concurrent communications ports)
- Data rates up to 64,000 bps with external clocking and up to 19,200 bps with internal clocking
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support

This offering also includes:

- Card-edge diagnostic wrap connectors (2)
- Customer diagnostics
- ROM-based bootstrap loader

The Multi-Protocol Communications Adapter has been designed for and is compatible with the 6150 mdls 020, 025, A25 and the 6151 mdl 10. This adapter includes many advanced features which provide enhanced performance and flexibility. These features include the following:

- Advanced high-performance Intel 80C51 microcontroller
- 8Kb of adapter memory
- Data transfers via Direct Memory Access
- 16-bit DMA data transfer width
- Adapter resident 4-channel alternate DMA controller
- Two selectable interrupt levels
- Shared interrupt level support
- Two selectable system DMA channels
- Two selectable adapter I/O address spaces
- Zilog 8530A Serial Communications Controller
- Three physical adapter ports
- Internal Business Machine Clocking (BMC) up to 19,200 bps
- CRC generation and checking

The Multi-Protocol Communications Adapter can be connected to a variety of data communications devices. It provides the capability of off-loading a significant portion of the real time communications processing from system's central processor thus providing a dedicated multi-port communication subsystem for data communications applications.

The Multi-Protocol Communications Adapter is based on a high-performance, 8-bit Intel 80C51 microcontroller. This adapter provides two independent serial communications ports that operate at speeds up to 64,000 bps using direct memory access. Three physical ports are present on the Multi-Protocol Communications Adapter. While all three ports can be connected to external data communications devices, only two adapter ports can be actively transferring data at any time.

Two port concurrency is supported at data rates up to 19,200 bps using either the asynchronous communications protocol (either half-duplex or full-duplex) or any half-duplex synchronous communications protocol. Single port operation is supported at data rates up to 19,200 bps for full-duplex synchronous protocols, and up to 64,000 bps for half-duplex bit synchronous protocols. Actual realized performance is dependent on the functionality supported by the user provided adapter level programming implementation and the general level of RT PC system activity at execution time.

Any adapter port can be programmed for asynchronous, bit synchronous, or character synchronous protocols. Any adapter port can be programmed to operate at data rates up to 64,000 bps. For operation at data rates in excess of 19,200 bps on either adapter port one or adapter port two, the length of the external device cable is a consideration. In these circumstances the use of the EIA RS-232-C/CCITT V.24/V.28 Modem Attachment Cable (#4812) is specifically recommended.

Note: The adapter's functionality as presented in a communications application running on the RP PC's main processor is dependent on the design characteristics of the 80C51 adapter level program that is provided by the user. The native adapter and its firmware provide a set of tools and procedures to facilitate the down-loading of such a program into the adapter's RAM memory space. The down-loaded 80C51 adapter level program must be designed to provide the appropriate communication function and control adapter level communication activities.

Communications between the Multi-Protocol Communications Adapter and the systems unit are done via I/O ports and DMA data transfers. Communication is synchronized by interrupts between the Multi-Protocol Adapter and the systems unit. Interrupt levels are selectable and can be shared with other adapters that provide interrupt sharing support.

Detailed technical information on the Multi-Protocol Communications Adapter is provided in the optional "RT PC Technical Reference".

Optional Features:

Modem Cable - RS-232-C (16 Pin) (P/N 6294812): Allows the user to connect one port of the Multi-Protocol Communications Adapter to a modem via a plug at the rear of the systems unit. The cable is shielded and is 3m (approximately 9.75 ft.) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable. This cable meets the EIA RS-232-C and CCITT V.24/V.28 specifications.

Autocall Unit Cable (P/N 6294814): Allows the user to connect one port of the Multi-Protocol Communications Adapter to an autocall unit via a plug at the rear of the systems unit. The cable is shielded and is 3m (approximately 9.75 ft.) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable. This cable meets the EIA RS-366 and CCITT V.25/V.28 specifications.

Modem Cable - X.21 (P/N 6294816): Allows the user to connect one port of the Multi-Protocol Communications Adapter to an X.21 modem via a plug at the rear of the systems unit. The cable is shielded and is 3m (approximately 9.75 ft.) long. The cable terminates in a 15-pin male connector. A wrap connector is provided to test the cable. This cable meets CCITT X.21 specifications.

Publications: The following related publications are available for purchase:

- IBM RT PC User Setup Guide (SV21-8020, P/N 74X9959)
- IBM RT PC Guide To Operations (SV21-8021, P/N 74X9955)
- IBM RT PC Problem Determination Guide (SV21-8022, P/N 74X9957)
- The appropriate maintenance manual:
 - IBM 6151 Model 010 Hardware Maintenance And Service (SV21-8026, P/N 74X9953)
 - IBM 6150 Model 020 and Model 025 Hardware Maintenance And Service (SV21-8025, P/N 74X9951)
- IBM RT PC Hardware Technical Reference (SV21-8024, P/N 7489961). The Multi-Protocol information in this publication includes:
 - Hardware Technical information
 - ROS firmware description
 - Adapter level programming information
 - Sample adapter level program listing

These publications will be ordered and updated via the System Library Subscription Service (SLSS). Additional publications orders will be accepted by the NDD Direct Response Operations (1-800-IBM-2468).

Customer Setup: The IBM RT PC Multi-Protocol Communications Adapter is designated "Customer Setup" (CSU).

Customer Responsibility: The customer must acquire appropriate communication software that specifically supports the IBM RT PC Multi-Protocol Communications Adapter or develop his own communication software.

The customer is additionally responsible for:

- Adequate site and system planning and preparation.
- Ordering appropriate attachment features.
- Physical setup, connection of cables, and checkout.
- Using and following the problem determination procedures prior to calling for service.

Packaging: The IBM RT PC Multi-Protocol Communications Adapter is packaged in a carton containing the adapter, warranty information, and diagnostic wrap connectors (2).

- 1 **4-Port Asynchronous RS-232-C Adapter (P/N 6294763):** (NO LONGER AVAILABLE) This adapter provides a subset of the EIA RS-232-C interface signals on each of four 10-pin connectors for the independent attachment of either ASCII terminals, asynchronous modems or serial printers, such as the IBM Pageprinter 3812 or 4201 Proprietary with serial interface (P/N 6493187). Maximum data rate supported is 19.2K bps over a 50 foot distance. This adapter may coexist in a 6150 with 4-Port Asynchronous RS-422-A Adapter (P/N 6294764) and the 5080 Peripheral Adapter (P/N 6487561). Each adapter requires an available 16-bit I/O slot. Limitations: The total number of these three types of adapters may not exceed four per 6150 System. Maximum: Four. Field Installation: Yes. Customer Setup: Yes.

- 1 **4-Port Asynchronous RS-422-A Adapter (P/N 6294764):** (NO LONGER AVAILABLE) This adapter provides a serial interface of EIA RS-422-A signals on each of four 6-pin connectors for the independent attachment of ASCII terminals. Maximum data rate supported is 19.2K bps over a distance up to 4,000 feet (user supplied surge suppressor required if over 122 meters). The interface cable should not be installed outdoors. This adapter may coexist in a 6150

with the 4-Port RS-232-C Adapter (P/N 6294763) and the 5080 Peripheral Adapter (P/N 6487561). Each adapter requires an available 16-bit slot. Limitations: The total number of these three types of adapters may not exceed four per 6150 System. Maximum: Four. Field Installation: Yes. Customer Setup: Yes.

Advanced Monochrome Graphics Display Adapter (P/N 6294765): Provides the bit mapped display adapter required to attach the 6153 Advanced Monochrome Graphics Display to an 6150 System Unit. The adapter is on a single card requiring a 16-bit I/O slot in the 6150 System Unit. This All Points Addressable (APA) design features a 1024 x 512 bit map on the adapter card which is directly addressable by the system microprocessor. Viewable area of 720 x 512 pels is supported, with the remaining bit map usable for fonts or workspace. Hardware assist on the card provides data alignment of both text and graphics to the pel level. Alphanumeric text characters are treated as graphic symbols by the hardware, and can therefore be tailored to any shape, size or style desired. Overlay operations are assisted by a programmable Write Mask. Limitation: Only two display adapters of any kind per 6150 System Unit (the two adapters must be different). Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes.

Advanced Color Graphics Display Adapter (P/N 6294766): Offers an adapter for attachment of the 6154 Advanced Color Graphics Display. The adapter features a 1024 x 512 x 4 bit map, and includes all functions of the Advanced Monochrome adapter above and also provides hardware support for the display of 16 simultaneous colors from a palette of 64 colors. A viewable area of 720 x 512 pels is supported, with the remaining bit maps usable for fonts storage or workspace. Additional hardware assist helps improve display response time. The adapter card requires one 16-bit feature slot in the 6150. Limitations: Only two display adapters of any kind per 6150 System Unit (the two adapters must be different). Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes.

Extended Monochrome Graphics Display Adapter (P/N 6294768): Provides a high performance, high resolution, bit mapped adapter for connection of the 6155 Extended Monochrome Graphics Display to an 6150 System Unit. The adapter is packaged on a single card, which requires a 16-bit feature slot in the 6150 System Unit. The adapter features a 1024 x 1024 bit map, and is directly addressable by the system processor. A viewable area of 1024 x 768 pels is supported, with most of the remaining bit map usable for font storage. Adapter hardware provides significant system off-load as well as fast front of screen response. A high level interface is presented to the system processor. The hardware architecture of the adapter supports a very fast rectangular area move, copy, merge, fill, rotate, and replace, as well as logical operations and line drawing. Hardware cursor support is also provided. The adapter contains a high performance list processor which executes primitives from an on-card queue. Hardware assist on the card provides date alignment to the pel level in either vertical or horizontal orientation. Alphanumeric text characters are treated as graphic symbols by the hardware, and can therefore be tailored to a variety of shapes, sizes or styles as desired. Limitations: Only two display adapters of any kind per 6150 System Unit (the two adapters must be different.) Field Installation: Yes. Customer Setup: Yes.

Streaming Tape Drive Adapter (P/N 6294798): Provides a QIC-02 (Quarter Inch Cartridge) tape interface to the 6150. It supports the attachment of the 6157 Streaming Tape Drive, which provides for data interchange capability between all models of the RT PC as well as for fixed-disk backup and restore at rates up to 4MB/min in image dump mode. Packages as a circuit card requiring a 16-bit feature slot in the 6160 system unit. Provides a 37 pin 'D' shell male external connector. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Monochrome Display and Printer Adapter (P/N 1504900): Supports attachment of the 5151/001 Monochrome Display (5151001) and/or the 5152 Graphics Printer (discontinued), the 4201/001 Printer, or the 5201/001 Quietwriter Printer. Limitations: Only two display adapters of any kind may be attached to the 6150 System Unit (the two adapters must be different). This option may be installed in only one of the two 8-bit feature slots (slot 3). Maximum: One adapter. Cable: The Printer Cable (P/N 1525612) is available to connect one of the above printers to the adapter. Field Installation: Yes.

tion: Yes. Customer Setup: Yes. National language character support is limited by the device attached.

IBM Personal Computer 3278/79 Emulation Adapter (P/N 8665789): Provides a coaxial connection between an RT PC and a 3174/3274 Display Control Unit, or between an RT PC and the integrated display/printer adapter of either the 4331 Processor or the 4361 Processor. The adapter provides the "handshaking" between the two units. Customer-supplies cabling is required. Host programming is required for host interactive applications. Consult the current RT PC software offering for 3270 software emulation available. Maximum: One adapter per system. Field Installation: Yes. Customer Setup: Yes.

IBM RT PC ESDI Magnetic Media Adapter (P/N 61X6341): This adapter is included as standard in Mdls 025 and A25 of the 6150. As the standard adapter in feature slot 1, it provides support for attachment of up to two 70MB ESDI Fixed-Disk Drives and up to two diskette drives (two PC AT High-Capacity Drives, or one PC AT High-Capacity Diskette Drive and one PC AT Dual-Sided Diskette Drive). A second adapter and cable (P/N 6298541) are required to attach the third fixed-disk drive to the 6150. Requires a 16-bit feature slot. Fixed-disk data rate is 10M bps. Diskette data rates are 250/300/500K bps. Limitations: Supports only the 70MB ESDI Fixed-Disk Drive (P/N 61X6941); does not support attachment of the 40MB Fixed-Disk Drive (P/N 6294735). The first adapter is standard on the Mdls 025 and A25 and is factory-installed in feature slot 1. The second adapter may be installed in either feature slot 2 or in feature slot 1 if the adapter in slot 1 is first moved to slot 2. Supports only one fixed-disk drive and no diskette drives if plugged into feature slot 2. If adapters are not alike and the standard adapter in slot 1 is moved to 2, the fixed-disk drive in drive position 1 must also be removed (to drive position 3).

Special Limitations: In some cases the 6150 Mdl 20 system unit (serial number 4700 or lower) may need to have the standard "disk/diskette" cable assembly replaced. For any of the conditions listed below contact IBM and a new cable assembly will be provided at no charge.

1. Replacing the standard 40MB Fixed-Disk Drive of a system unit having a serial number of 4700 or lower with a 70MB ESDI Fixed-Disk Drive.
2. Adding two 70MB ESDI Fixed-Disk Drives to a system unit having a serial number of 4700 or lower.
3. Adding a second 70MB ESDI Fixed-Disk Drive to a system unit having a serial number of 4700 or lower which has one 40MB Fixed-Disk Drive and one 70MB ESDI Fixed-Disk Drive already installed.

Maximum: Two (one standard and one additional feature). Field Installation: Yes. Prerequisites: Requires an available 16-bit feature slot - either slot 1 or slot 2). RT PC Fixed-Disk Attach Cable (P/N 6298541) also required to attach disk to adapter plugged into feature slot 2. Customer Setup: Yes.

IBM RT PC Baseband Adapter (P/N 61X6810): The IBM RT PC Baseband Adapter for use with Ethernet(TM) provides a connection for all models of the RT PC to a 10 Megabit Carrier Sense Multiple Access/Collision Detection (CSMA/CD) Ethernet Network. The adapter contains a memory mapped system interface and jumpers to move the memory address space and interrupt level.

The adapter attaches to the network via standard multiwire cable which is connected to a CSMA/CD transceiver. Network cabling and transceivers may be obtained from numerous vendors. Highlights are:

- Allows use of the RT PC Interface Program LP for connection to Ethernet type networks
- 16K bytes of RAM for data buffering
- Selectable interrupt levels
- Timer interrupt
- Selectable RAM addresses
- Standard 15-pin network connector
- Uses either thick or thin cable
- Will plug into either the 8-bit or 16-bit slots
- Up to two Adapters can be plugged in the same IBM RT PC

(TM) Ethernet is a trademark of Xerox, Inc.

The Baseband Adapter is a feature card for all 6150 and 6151 models. The adapter contains 16K bytes of internal RAM which allows independent buffering from transmit and receive frames in order to improve performance. The adapter may be attached to either "thick" or "thin" Ethernet type networks by choosing the appropriate third party supplied cable and transceiver.

Publications: Setup and installation instructions for the adapter are contained in the "IBM RT PC User Setup Guide and Options Installation", SV21-8020. The customer is responsible for following the problem determination procedures in the "IBM RT PC Problem Determination Guide," SV21-8022 before calling their point of sale for service.

Hardware Requirements: The Baseband Adapter will plug into any model of the 6150 and 6151 system units.

Software Requirements: This product requires that the IBM RT PC AIX Operating System Version 1.1 (59X8994) be installed.

Limitations: The Baseband Adapter must NOT be plugged into slot eight on the 6150 models 20, 25, and A25, or slot five on the 6151 model 10.

Planar must be at, or higher than EC# A39735H on the RT PC Models 020, 25, A25, or EC# A31283M on the 6151 Model 10.

Security Auditability and Control: The RT PC can be used and managed so as to limit the risk of unintended modification, destruction, or disclosure of sensitive data. User management is responsible for evaluation, selection, and implementation of security features, for administrative procedures, and for appropriate controls in application systems. If sensitive data is sent over external communication facilities, user management may wish to pursue the application of cryptography. Customer Setup (CSU): Yes.

IBM RT PC Advanced Floating-Point Accelerator (P/N 61X6815): Provides capability to support both single (32-bit) and double (64-bit) precision floating-point operations using multiple sets of registers provided on the feature. Provides significantly improved performance over the RT PC Floating-Point Accelerator (P/N 6294758). Advanced Floating-Point Accelerator (P/N 61X6815) is microcoded to be compatible with Floating-Point Accelerator (P/N 6294758) so most existing applications may be executed without change. Supports operations and basic format defined by the ANSI/IEEE 754-1985 Binary Floating-Point Standard. Circuitry packaged as a card which plugs into a special slot (Slot B) on the RT PC system board.

Technical Information: Supports add/subtract/multiply/divide/compare -- supports conversion between single and double precision, and between floating-point and integer formats -- supports additional operations "negate" and "absolute" -- supports transcendental functions. Includes 2,048 32-bit words of random access memory for internal data storage and floating-point registers. Includes 4,096 words of random access memory (not user addressable) for microcode storage. Limitations: Cannot be installed concurrently with the RT PC Floating-Point Accelerator (P/N 6294758). Maximum: One. Field Installation: Yes. Prerequisites: The RT PC Advanced Interactive Operating System (AIX), Version 2.1 (P/N 92X1324) is required to support this feature. The microcode is loaded into the Advanced Floating-Point Accelerator memory by the AIX Operating System, Version 2.1 at IPL-time. Also requires an available floating-point accelerator slot (Slot B). Customer Setup: Yes.

IBM RT PC 70MB ESDI Fixed-Disk Drive (P/N 61X6941): Provides additional disk storage for user programs and data for either Mdl 020 or Mdl 025. Replaces previously announced RT PC 70MB Fixed-Disk Drive (#3426). One fixed-disk drive is provided as standard in the 6150 (40MB drive on the Mdl 020, 70MB ESDI drive on the Mdl 025). Technical Information: ESDI Interface -- 512 bytes per sector -- 35 or 36 sectors per track -- 70MB capacity -- 3600 RPM -- 40 ms average access time -- 10M bps transfer rate. Maximum: Three (one standard and up to two additional features). Field Installation: Yes. Prerequisites: Requires RT PC ESDI Magnetic Media Adapter (P/N 61X6341). First additional disk drive attaches to adapter (P/N 61X6341) provided as standard in the 6150; second

additional drive requires additional adapter (P/N 61X6341) in 6150 Model 025 and also Fixed-Disk Attach Cable (P/N 6298541). If 70MB ESDI drive is to be added to 6150 Mdl 020, an ESDI Magnetic Media Adapter (P/N 61X6341) and cable (P/N 6298541) will be required regardless of whether the 70MB ESDI drive is the second or third drive in the Mdl 020. Customer Setup: Yes.

IBM RT PC Small Computer System Interface Adapter: (P/N 61X7000) This adapter, associated cables, and associated software were designed in consideration of the ANSI Standard (X3.131.1986) and support the Mandatory Command Set for disk and tape, as well as selected Optional and Extended Commands for disk and tape (See RT PC Hardware Technical Reference for interface description).

This adapter provides the means to attach appropriately designed tape and disk products including a string of up to seven 9332 Direct Access Storage Devices, either mdls 250 and/or 450 (stand-alone external DASD), or mdls 240 and/or 440 (rack-mounted DASD, using the 9309 Rack Enclosure). The adapter is a feature card which plugs into a 16-bit feature slot of any model of the 6150. The 9332 mdls 240, 250, 440 and 450 all employ the Small Computer System Interface and all are external to the RT PC. Mdls 240 and 250 have a formatted capacity of 200MB, and the mdls 440 and 450 have a formatted capacity of 400MB. Within stand-alone or rack models, different sizes may be intermixed on a string. The Adapter supports the Small Computer System Interface Differential Driver/Receiver interface option and the Alternative 2 Connector. The data transfer between the RT PC and the Adapter uses DMA mode. The Adapter supports burst data rates of up to 3.5MB/second, but effective rates are lower. Limitation: A total of 14 9332 DASD of up to 400MB each may be attached to the RT PC using two Adapters, for an attached storage total of 5.6GB. The I/O performance using the RT PC Small Computer System Interface Adapter and the 9332 DASD is dependent upon the system configuration and the number and types of tasks being performed. Maximum: Two adapters per RT PC. Field Installation: Yes. Customer Setup: Yes.

Note: Signal cables are supplied as no charge items (one per 9332) along with the 9332 DASD order. See M9332 pages. Additional cables may be ordered with the RT PC as charge items. (See "Accessories" section.)

IBM RT PC 4MB Fast Memory Expansion (P/N 61X7004): This option increases the system memory of a Model 125 or B25 by 4MB. Up to two 4MB Fast Memory cards can be added to the system to supplement the standard 4MB of fast memory on the Advanced Processor Card. The Fast Memory Expansion option cards plug into dedicated memory card slots in the system. 4MB and 8MB Fast Memory cards can be used in combination in the two slots so long as the system total does not exceed 16MB, including the 4MB on the processor card.

Memory is divided into two arrays of 2MB each with interleaving to overlap memory access and achieve the equivalent of 100-nanosecond cycle time. Four data bytes and one error correcting code (ECC) byte are transferred at a time over a 32-bit data path plus 8-bit ECC. Limitations: Not available for IBM 6150 Models 020, 025, or A25. Must be plugged in one of two memory slots. Maximum system memory may not exceed 16MB, including the 4MB standard memory on the Advanced Processor Card. Maximum: Two per system. Field Installation: Yes. Prerequisites: Available memory slot. Customer Setup: Yes.

IBM RT PC 8MB Fast Memory Expansion (P/N 61X7008): This option increases the system memory of a Model 125 or B25 by 8MB. Only one 8MB Fast Memory Expansion options may be added to the system, either alone or in combination with the 4MB Fast Memory Expansion option. Fast Memory Expansion cards plug into two dedicated memory slots in the system. 4MB and 8MB Fast Memory cards may be used in combination in these two slots so long as the system total does not exceed 16MB, including the 4MB on the processor card.

Memory is divided into two arrays of 4MB each with interleaving to overlap memory access and achieve the equivalent of 100-nanosecond cycle time. Four data bytes and one error correcting code (ECC) byte are transferred at a time over a 32-bit data path plus 8-bit ECC. Limitations: Not available for IBM 6150 Models 020,

025, or A25. Must be plugged in one of two memory slots. Maximum system memory may not exceed 16MB, including the 4MB standard memory on the Advanced Processor Card. Maximum: One per system. Field Installation: Yes. Prerequisites: Available Memory slot. Customer Setup: Yes.

5080 Peripheral Adapter (P/N 7487561): This adapter provides for the attachment of the Lighted Program Function Keys (P/N 6246799) and the Dials (P/N 6248436). This optional 3-port card plugs into a 16-bit slot on the 6150. The ports provide an RS-232-C subset, (XON/XOFF protocol only) as well as DC power to the attached devices, via the 5080 Peripherals Adapter Cable Kit (P/N 6487564). One cable kit is required for each 5080 Peripheral attached. Modem control lines have been preconditioned on the adapter so that a plotter may be attached to any port using the Xon-Xoff pacing protocol and the same printer/plotter cable used for attachment to the 4-Port Asynchronous RS-232-C Adapter. Limitations: The total number of these adapters and the 4-port RS-232-C and RS-422-A Adapters may not exceed four per 6150 System. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Megapel Display Adapter (P/N 6247658): Is a high-resolution display adapter which provides a direct connection for the IBM 5081 Model 11, 12, 16 or 19 displays or the IBM 5082 Projection System to an RT PC system unit (any model). (Note: Feature Code #2001 is required on 5081 Display for attachment to Megapel Adapter). The Adapter allows the attached monitor to function both as the application display and the system operator console. (Note: The monitor attached to the Megapel Adapter is not supported as an operator console by the PC AT Coprocessor Services Licensed Program or by application programs running in Coprocessor mode. However, a supported display, either the IBM 5151 or the IBM 5154, may be added to the system to provide a console for Coprocessor support.) The Megapel Display Adapter supports 1024 x 1024 resolution on its attached display, 256 colors from a palette of 4096 colors for color monitors, or 16 shades of gray on monochrome monitors. The Adapter has a high speed LSI pel processor with Pick and Scissor capability as standard, which provides high speed Vector Draw, BIT/BLT, and Area Fill.

The Adapter is packaged on two linked cards which require two adjacent 16-bit feature slots in the system unit. Adapter also provides a parallel printer interface identical to the printer interface on the PC Monochrome Display Adapter, thereby eliminating the need for a separate parallel printer adapter and the use of a slot for that purpose. The Adapter includes a six foot signal cable to attach the monitor to the Adapter card.

The Megapel Display Adapter is supported by two application interfaces, graPHIGS* (IBM's Programmer's Hierarchical Interactive Graphics Standard) and GSL (Graphics Support Library). A software prerequisite for Adapter support is either AIX Version 2.1 or VRM Version 2.1.

Limitations: Limited to one Megapel Display Adapter per RT PC System. Requires a minimum of 2MB memory in the RT PC System. Requires two adjacent 16-bit feature slots. Not supported as system console adapter for use with PC AT Coprocessor Feature (P/N 6294756). Can coexist on a 6150 or 6151 system unit with a native display adapter (6153, 6154 or 6155), with a supported PC display (5151 or 5154), and with the 5080 Attachment Adapter (P/N 6247860). Can coexist with #4900, IBM Monochrome Display and Printer Adapter, but only one parallel printer adapter per system may be active. Maximum: One. Field Installation: Yes. Prerequisites: Two adjacent available 16-bit feature slots. (See 5080 Sales Pages for corequisites for attached 5081 Display). Customer Setup: Yes.

5080 Attachment Adapter (P/N 6247860): This feature plugs into a 16-bit feature slot in an appropriately configured 6150 Mdl 020 or 025 and enables these models to connect to the 5080 Graphics System like the Mdl A25. This feature is required on the Mdl 020 and 025 for attachment to the 5080 Graphics Workstation. This feature is standard on the Mdl A25, but may also be purchased separately for use with a previously installed Mdl 020 or 025. (Consult specific Application requirements for recommended configuration of fixed-disk and memory). As in the Mdl A25, connection of the 5080 system to the 6150 Mdl 020 or 025 with this adapter allows the

workstation to operate in a stand-alone environment, with the 6150 as a private host. It allows the workstation to be switched between stand-alone and S/370 mainframe interactive modes via the keyboard. Mainframe interaction provides the 5080 with access to S/370 applications. (Note: See Announcement Letter for Corequisite features required on the 5080 and 5088 and recommended hardware and software configurations. The CAD/CAM application must reset the 5080 state when switching between the mainframe and the 6150.) The attachment is made via a 4.6m (15 ft) industry standard coaxial cable supplied with the adapter. Customer supplied coaxial cable may also be used. See physical planning information. Transfer speed of information between the 6150 and 5080 can be up to 2M bits/sec. The 5080 Attachment Adapter includes the attachment card, a 15 ft. coaxial cable for connection of the 5080 to the RT PC, a 15 ft. 'Y' cable for switching the keyboard and tablet between the 5080 and RT PC, required microcode, and supporting publications. Limitation: 5083 Tablet, and keyboards other than English US, are supported only on the 5080, although the devices are switchable to the RT PC. Maximum: One. Field Installation: Yes. Customer Setup: Yes. (Note: The 5080 Attachment Adapter is Customer Setup, but assistance of Field Service Personnel is required in order to install Corequisite features on the 5080 Graphics System in order to complete the connection.

S/370 Host Interface Adapter (P/N 6247893): This feature plugs into a 16-bit feature slot in an appropriately configured 6150 (any model). Provides a high-speed link from a 6150 to a S/370 Host via a 5088 Graphics Channel Controller. RT PCs may be attached on a single connection over user-supplied coaxial cable, using up to 16 link addresses. The adapter contains 64K bytes of programmed random access memory to control the link. Nominal link speed is 2M bps. The adapter feature includes the attachment card, required microcode, and supporting publications. Customer-supplied coaxial cable is required. See physical planning information. Host programming is required for Host Interactive Applications. (Note: The Mode Shared Attachment Feature (#9301) must be installed on the 5088 if the 5088 serial number is below 2000.) Maximum: One. Field Installation: Yes. Prerequisites: The RT PC Workstation Host Interface Program (RFA #11836) running under the RT PC Advanced Interactive Executive (AIX) Operating System, Version 2.1, is required for support of the connection. Customer Setup: Yes.

1MB Memory Expansion (P/N 6848222): Increments system memory by 1MB (one million bytes) on 6150 Mdl 020 or 025. Packaged on a card which plugs into an additional memory slot on 6150. Technical Information: Divided into two 'arrays' of 512KB:

64K x 4 DRAM Modules,

32-bit data path plus 8-bit ECC

Uses interleaving to overlap memory accesses

170 nsec effective memory cycle (23.5 megabytes/second).

Maximum: One additional. Field Installation: Yes. Prerequisites: An available additional memory slot in the 6150 Processor. Customer Setup: Yes.

Mouse (P/N 6298426): Provides a two button mechanical device to provide positioned input for screen pointing and cursor movement on a display screen. Includes 2.5m (8.2 ft) cable, and plugs into a specially keyed locator port on the 6150 Systems Unit, which includes adapter as standard. Limitations: Cannot be used with the 5083 Tablet. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

Dials (P/N 6248436): Provides a set of eight continuous turn cone-like dials in a compact dial unit which can be used to input scalar values so that they can be interpreted by the application program to adjust the image on the screen (operation such as panning, zooming, scaling, or image rotation). The Dials device is supplied with a 1.4m cable which plugs into the 5080 Peripherals Adapter via an attachment cable kit (P/N 6487564). Cable length total is 2.6m (8.5 ft). 5080 Peripheral Adapter supplies DC power to the dials. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES

IBM Personal Computer AT Communications Cable (P/N 6450217): Provides a 9-pin 3-meter cable for attaching a modem to the RS-232-C serial port provided on the IBM Personal Computer AT Serial/Parallel Adapter option (P/N 6450215).

IBM Personal Computer AT Serial Adapter Connector Cable 9-Pin (P/N 6450242): Provides a 10-inch 9-pin to 25-pin adapter cable which allows external devices to attach to the serial port on the IBM Personal Computer AT Serial/Parallel Adapter (P/N 6450215).

IBM RT PC Small Computer System Interface Adapter Cable (P/N 79X3468): Provides a cable to connect the RT PC Small Computer System Interface Adapter option (P/N 61X7000) to the first 9332 DASD device in the string. This 8 meter cable has a 62-pin "D" connector at the host end and a 50-pin Small Computer System Interface Alternative 2 Connector at the device end. Included with the cable is a terminator to attach to the last device at the end of the string.

IBM RT PC Small Computer System Interface Device-to-Device Cable: (P/N 79X3470) Provides a one meter long cable used to connect one 9332 DASD to the next 9332 DASD in the string. The cable has a 50-pin Small Computer System Interface Adapter Alternative 2 Connector at either end.

New Model Series Upgrade Kit (P/N 61X6833): This kit contains the hardware, software, and instructions necessary to upgrade a model 015 to a model 115, a model 025 to a model 125, or a model A25 to a model B25. Model 020 may also be upgraded to a Model 125, but this upgrade requires that the customer first acquire either a 70MB Extended ESDI Fixed-Disk Drive (P/N 79X3988), or a 70MB ESDI Fixed-Disk Drive (P/N 61X6941) which will be reformatted to the Extended ESDI format during the upgrading process. The kit consists of a New Model Series Advanced Processor Card with new 100 nanosecond cycle CMOS processor, built-in floating-point unit, and 4MB of on-card fast memory; an Extended ESDI Magnetic Media Adapter, an Extended ESDI Magnetic Media Adapter Cable, a Utility Program Diskette with ESDI-to-Extended ESDI Reformatting Utility Program, and Customer Setup Instructions for the Upgrade Kit. Hardware publications updates for the New Series Models and diagnostic diskettes accompany the Upgrade kit in a separate carton.

A prerequisite for the Upgrade Kit is AIX Operating System Version 2.1.

Limitations: The Upgrade Kit is only available for sale for the purpose of upgrade of earlier RT PC Models 010, 015, 020, 025, and A25. Limited to one Upgrade Kit per system. See special terms and conditions for Upgrade Kit in Announcement Letter dated January 27, 1987.

NOTE: Upgraded systems to which the Upgrade Kit has been only partially applied, or upgraded/new systems which include components with lesser performance than the components of the new series, will have lower levels of performance. Maximum-One per RT PC System. Field Installation: Yes. Prerequisites: RT PC Model 015, 025, or A25, or RT PC Model 010 or 020 plus either 70MB Extended ESDI Fixed-Disk or 70MB ESDI Fixed-Disk which is to be reformatted to Extended ESDI format. Customer Setup: Yes.

Modem Cable (Metric) (#3821): This provides a cable which allows the user to connect one port of the Multiprotocol Adapter to an X.21 modem via a plug at the rear of the System Unit. This cable is shielded and is 3 meters (approximately 9.75 feet) long. The cable terminates in a 15-pin male connector, and supplies fastening screws for the connector which have Metric threads. A wrap connector is provided to test the cable. This cable meets CCITT X.21 specifications.

IBM RT PC ASCII Terminal Cable - RS-232-C (10/25M-Pin) (#3913): This is a 3-meter interface cable for attaching the IBM 316X family of ASCII terminals to any of the ports on the Four-Port Asynchronous RS-232-C Adapter or to the standard RS-232-C ports in the base unit

of the 6150 models. This cable has a 25-pin male "D" connector for the terminal and a 10-pin connector for the adapter.

Modem Cable - RS-232-C (10-Pin) (#4704): Provides a 3-meter interface cable for attaching an asynchronous modem to any of the ports on the 4-port asynchronous RS-232-C adapter or to the standard RS-232 ports on the 6150 Base System Unit. This cable has a 25-pin D connector for the modem and a 10-pin modu connector for the adapter.

ASCII Terminal Cable - RS-422-A (6-pin) 20 Meter (#4802): Provides a 20-meter interface cable for attaching an RS-422-A terminal to the 4-port asynchronous RS-422-A adapter. This cable has a 25-pin D connector for the terminal and a 6-pin modu connector for the adapter.

Serial Printer Cable (10-Pin) (#4803): Provides a 3-meter interface cable for attaching a serial printer or plotter to one of the standard RS-232-C ports on the 6150 base system unit or to the 4-port asynchronous RS-232-C Adapter.

PC Printer Cable (#5612): Provides a 2-meter cable for attaching a printer to the parallel port provided by either the IBM Personal Computer AT Serial/Parallel Adapter option (#0215) (6450215) or the Monochrome Display and Printer Adapter option (#4900) (1504900).

5080 Peripheral Cable Kit (#7564): Provides a 1.2m (48 in.) cable which connects the RT PC 5080 Peripheral Adapter to the device cable of either of the following options:

- Lighted Program Function Keyboard (#4710)

The Lighted Program Function Keyboard is equipped with a 1.2m (45 in.) device cable which connects to this cable kit option, resulting in a total cable length of 2.4m (7.8 ft).

- Dials (#8710)

The Dials device is equipped with a 1.4m (54 in.) device cable which connects to this cable kit option resulting in a total cable length of 2.5m (8.5 ft).

5083 Tablet Cable Kit (P/N 6487586): Provides a 1.4m (55 in.) cable for attaching either of the 5083 Mdl 1 or Mdl 2 Tablets to the locator port of either the 6150 or 6151. The tablet device cable is 1.2m (45 in.), resulting in a total cable length of 2.5m (8.2 ft). (Not required for IBM 5083 Model 11A Cursorpad or Model 12A Tablet- Model 11A 12A Tablets attach directly to the RT PC Locator Port via a cable ordered with the Tablet. To order an RT PC Cable Kit attachment for the 5083 Tablet Models 11A and 12A, see FC #4010 in the 5083 Sales Pages).

ASCII Terminal Cable - RS-422-A (6-Pin) 3 Meter (P/N 6487641): Provides a 3-meter interface cable for attaching an RS-422-A terminal to the 4-port asynchronous RS-422-A adapter. This cable has a 25-pin D connector for the terminal and a 6-pin modu connector for the adapter.

ASCII Terminal Cable - RS-232-C (10 Pin) (P/N 6298186): Provides a 3-meter interface cable for attaching an ASCII terminal to any of the ports on the 4-Port Asynchronous RS-232-C adapter or the standard RS-232-C ports on the 6160 System Planar Board. This cable has a 25-pin D connector for the terminal and a 10-pin modu connector for the adapter.

ASCII Terminal Cable - RS-232-C (9 Pin) (P/N 6848245): Provides a 3-meter interface cable for attaching an ASCII terminal to the IBM Personal Computer AT Serial/Parallel Adapter. This cable has a 25-pin D connector for the terminal and a 9-pin D connector for the serial part of the Serial/Parallel Adapter.

Fixed-Disk Attach Cable (P/N 6298541): Provides the cable to attach adapter (#0428) (6080428) for the third fixed-disk drive, either 40MB or 70MB, to a 6150.

PC Serial Printer Cable (9 Pin) (P/N 629899): Provides a 3-meter cable for attaching a serial printer or plotter to the RS-232-C serial port provided on the IBM Personal Computer AT Serial/Parallel Adapter option (P/N 6450215).

IBM IBM Canada Ltd.

MACHINES

M 6150.12
APR 87

SUPPLIES

Available from IBM.

6151 SYSTEM UNIT

PURPOSE

The System is a microprocessor-based workstation-oriented system that offers a multi-user, multi-tasking operating system with an ease-of-use interface to system services. Program languages for both engineering/scientific and general purpose application development are supported. The RT PC also provides virtual machine support and hardware assisted virtual memory management. The RT Personal Computer can operate effectively in both host and workstation environments. The RT PC is designed to satisfy computing needs typical of general business and administrative, academic, engineering and scientific, and office environments, with discipline-specific as well as personal productivity applications. The capability of any model to attach high-resolution 5081 displays also makes it attractive in environments such as technical publishing, document preparation, graphics design, multi-tasking, and CAD/CAM. With the optional IBM Personal Computer AT Coprocessor and appropriate software, many IBM Personal Computer AT programs can also be run on the RT PC System.

MODELS

Model 010: System Unit, 1MB Memory, 40MB Fixed Disk Drive, Fixed-Disk Drive and Diskette Drive Adapter, High Capacity (1.2MB) Diskette Drive, Integrated Date/Time Clock, Keylock.

Model 015: System Unit, 2MB Memory, 70MB Fixed-Disk Drive, ESDI Magnetic Media Adapter, High Capacity (1.2MB) Diskette Drive, Integrated Date/Time Clock, Keylock.

Model 115: System Unit, Advanced Processor Card with 100 nsec processor and memory management unit, built-in 20M Hz floating-point unit, and 4MB of fast memory; 70MB Extended ESDI Fixed-Disk Drive, Extended ESDI Magnetic Media Adapter, High Capacity (1.2MB) Diskette Drive, Integrated Date/Time Clock, Keylock.

Prerequisites: The RT PC requires a supported video display adapter and monitor for display output. Attachment of one of the following options will satisfy this prerequisite:

- An IBM 6153 Advanced Monochrome Graphics Display and the RT PC Advanced Monochrome Graphics Display Adapter (P/N 6294765).
- An IBM 6155 Extended Monochrome Graphics Display and the RT PC Extended Monochrome Graphics Display Adapter (P/N 6294768).
- An IBM 6154 Advanced Color Graphics Display and the RT PC Advanced Color Graphics Display Adapter (P/N 6294766).
- An IBM 5151 Personal Computer Display and either the IBM Monochrome Display and Printer Adapter (P/N 1504900) or the IBM PC Enhanced Graphics Adapter (P/N 1501200) Supports national language characters contained in the base PO code page (PC code page 437) only.
- An IBM 5154 Personal Computer Enhanced Color Display (#4001) and the IBM PC Enhanced Graphics Adapter (P/N 1501250) Supports national language characters contained in the base PO code page (PC code page 437) only.

Minimum Configuration: Minimum configuration for both warranty and post-warranty service is System Unit, Keyboard, and one supported display.

Customer Setup (CSU): The RT PC is customer setup.

HIGHLIGHTS

- The 6151 is a desktop unit which houses the processor memory, internal media and the required adapter cards, and attaches the display and keyboard.
- The 6151 mdl 010 contains a 1MB Memory Card with Error Correcting Code (ECC) and a slot for an additional memory card, which can either be a 1MB, 2MB or a 4MB card. Maximum memory 5MB (8MB with replacement of standard mdl 010 1MB Memory Card).
- The 6151 mdl 015 contains a 2MB Memory Card with Error Correction Code (ECC) and a slot for an optional additional memory card, which can either be a 1MB, 2MB or 4MB card. Maximum memory 6MB (8MB with replacement of the standard mdl 015 2MB Memory Card).
- The 6151 new series model 115 comes equipped with a standard 4MB of fast memory on the Advanced Processor Card. Two memory slots in the system unit are available for optional additional memory cards, which may be either 4MB or 8MB Fast Memory cards, up to a total of 12MB of additional memory. Maximum memory for the Model 115 is 16MB of Fast Memory, including the 4MB Fast Memory on the Advanced Processor Card.
- The 6151 mdl 010 contains one 40MB fixed-disk drive and one High capacity (1.2MB) Diskette Drive.
- The 6151 mdls 015 and 115 each contain one 70MB fixed-disk drive (ESDI in the model 015, Extended ESDI in the model 115) and one High Capacity (1.2MB) Diskette Drive.
- The 6151 contains six feature slots. These slots allow addition of optional feature cards to support additional devices, features or memory. Five of these slots are full feature slots that will accept 16-bit feature cards. The remaining one is a specialized slot that will accept 8-bit I/O feature cards.
- The following features are standard with the 6151:
 - 101-key keyboard with new IBM layout used with IBM 3161 ASCII Display Station. National Language keyboard (102 characters) may be specified.
 - Six system feature slots (one is required for a display adapter and one for disk/diskette adapter).
 - IBM developed full 32-bit microprocessor with 100 nsec processor cycle time (Model 115).
 - IBM developed full 32-bit microprocessor with 170 nsec processor cycle time (Models 010 and 015).
 - IBM developed 40-bit virtual memory management unit.
 - Hardware page-level storage protect.
 - 284 watt (maximum) power supply.
 - Programmable speaker which can be used to produce tones.
 - System clock/calendar with CMOS RAM and battery backup.
 - A slot for the optional or advanced Floating-Point Accelerator.
 - 24-bit addressing, 16-bit data path on I/O bus.
 - Dedicated port for attaching optional Mouse or Tablet.
 - User lockable security keylock which can help to prevent removal of cover, initialization of system, and entry of command/date from keyboard.
- The 6151 Model 010 contains a PC AT Fixed-Disk and Diskette Adapter, which can support one 40MB Fixed-Disk Drive and one diskette drive. The 6151 Model 015 contains one ESDI Magnetic Media Adapter, which can support one 70MB ESDI Fixed-Disk and one diskette drive. The 6151 Model 115 contains one Extended ESDI Magnetic Media Adapter, which can support one 70MB Extended ESDI Fixed-Disk and one diskette drive. (Each of the three kinds of adapters supports a specific kind of fixed-disk drive only.)
- Dimensions (approximate):

Height - 160mm (6.3 in.)
Width - 540mm (21.3 in.)
Depth - 424mm (16.7 in.)
Weight - 23kg (50 lbs.)

- Some of the new options available for the 6151 include:
 - 1MB Memory Expansion
 - 2MB Memory Expansion
 - 4MB Memory Expansion
 - S/370 Host Interface Adapter
 - Small Computer System Interface
 - ESDI Magnetic Media Adapter
 - Floating-Point Accelerator
 - Personal Computer AT Co-processor Card
 - Advanced Monochrome Graphics Display Adapter
 - Extended Monochrome Graphics Display Adapter
 - Advanced Color Graphics Display Adapter
 - Streaming Tape Drive Adapter
 - Mouse
 - 4-Port Asynchronous RS-232-C Adapter (Buffered)
 - 4-Port Asynchronous RS-422-A Adapter (Buffered)
 - 5080 Peripheral Adapter
 - 4MB Fast Memory Expansion (Model 115 only)
 - 8MB Fast Memory Expansion (Model 115 only)
 - Advanced Floating-Point Accelerator
 - Megapal Display Adapter
 - Token Ring Network Adapter
 - Multiprotocol Communications Adapter
 - Baseband Adapter
 - New Model Series Upgrade Kit (Models 010 and 015 only)

The following currently available options, features, and IBM peripheral devices are supported on the 6151:

- IBM 5151 Personal Computer Display
- IBM Monochrome Display and Printer Adapter (P/N 1504900)
- IBM 5154 Personal Computer Enhanced Color Display
- IBM PC Enhanced Graphics Adapter (P/N 1501200)
- IBM PC Graphics Memory Expansion Card (P/N 1501201)
- IBM PC Graphics Memory Expansion Kit (P/N 1501203)
- IBM Personal Computer AT Math Co-processor (P/N 6450211)
- IBM Personal Computer AT 512KB Memory Expansion Option (P/N 6450203)
- IBM Personal Computer AT Serial/Parallel Adapter (P/N 6450215)
- IBM Personal Computer 3278/9 Emulation Adapter (P/N 6487844) (No Longer Available)
- IBM PC Network Adapter (P/N 6450213)
- Lighted Program Function Keyboard (P/N 6246799)
- Dials (P/N 6248430)
- IBM 5083 Tablet Mdl 11 and 12 (No Longer Available)
- IBM 5201 QUIETWRITER Printer, Mdl 1 and 2 (Mdl 2 supported in character mode and IBM 5152 compatible graphics mode only).
- IBM 4201 Proprinter
- IBM 5152 Graphics Printer (Withdrawn from marketing by IBM)
- IBM 5182 Color Printer (Withdrawn from marketing by IBM)
- IBM 6157 Streaming Tape Drive
- IBM 7371 Color Plotter
- IBM 7372 Color Plotter
- IBM 7374 Color Plotter
- IBM 7375 Color Plotter Mdl 1 and 2
- ASCII Workstations

IBM 3161 ASCII Display Station (and IBM 3163 in 3161 mode).

IBM PCs (IBM PC, IBM PC XT, and IBM Personal Computer AT) with Asynch cards and emulation software.

ASCII terminals that adhere to ANSI 3.64 protocol as implemented by DEC VT100* and DEC VT220* or equivalent.

Support is limited to US 7-bit ASCII characters.

- IBM Personal Computer AT Communications Cable (P/N 6450217)
- IBM Personal Computer AT Serial Adapter Connector Cable (P/N 6450242)
- IBM Personal Computer Printer Cable (P/N 1525612)
- IBM PC Advanced 3278/79 Emulation Adapter (P/N 8665789)
- IBM 5083 Tablet Models 11A and 12A
- IBM 3852 Model 2 Colorjet Printer
- IBM 4202 Proprinter XL
- IBM 5081 Display Models 11, 12, 16 and 19
- IBM 5842 Modem
- IBM 6184 Color Plotter
- IBM 9332 DASD Models 240, 250, 440 and 450
- IBM 9309 Rack Enclosure Models 1 and 2

* VT-100 and VT-220 are Registered Trademarks of Digital Equipment Corporation.

Publications

- RT PC Concepts (GC23-0784): Provides a high-level overview of the IBM RT PC hardware, AIX Operating System, and its management applications and supporting publications.
- RT PC Guide to Operations (SV21-8021): Describes procedures for operating the hardware, including the system unit, the display, the keyboard, and other IBM devices which can be attached.
- RT PC User Setup Guide (SV21-8020): Describes how to set up and cable together the system components which IBM supplies. Also describes how to install optional adapters, cards, and drives in the System Unit.
- RT PC Problem Determination Guide (SV21-8022): Describes how to locate, identify, and correct problems with the system. Also shows how to run hardware diagnostic utilities to gather information on software problems. Includes a high capacity (1.2MB) diskette containing the 6100 diagnostic routines.
- RT PC 6151 System Unit Hardware Maintenance and Services (SV21-8026): Contains information and procedures to enable maintenance service personnel to isolate and repair a malfunction in the 6151 system unit.
- RT PC Hardware Technical Reference (SV21-8024): This manual is designed to provide hardware design and interface information for engineers and programmers involved in the design of hardware or software to interface to the RT PC.
- RT PC Planning Guide (GC23-0782): Provides a system overview as well as the physical specifications of components; power, cable, lighting surge protection and environmental requirements; and customer responsibilities.

SPECIFY

- (Except Canada > Voltage/Line Cord/Publications Language will be supplied automatically based on country code of the order, and specify feature codes are not normally required. Only specify the feature codes below on an exception basis, when an alternative to the country default is required. <)
- (Except Canada > Voltage and Line Cord: Country default voltage and matching line cord are automatically supplied based on country code of order. List of countries below shows country defaults for line cord (part number).

For voltage and matching line cord other than default value, call Plant of Control (Vimercate) Order Department.

- High Voltage: 220V AC (180-259V), 50/60 Hz, IEC 380/435, EIF Safety Mark.
- Low Voltage: 110V AC (90-137V), 50/60 Hz, UL/CSA Safety Mark.

Item No. Country

Voltage Default

1838574	Thailand (856)	High Voltage
6952300	Bahamas (619), Barbados (621), Bermuda (627), Bolivia (629), Canada (649), Colombia (661), Costa Rica (663), Dominican Republic (681), Ecuador (683), El Salvador (829), Guatemala (731), Guyana (640), Honduras (735), Jamaica (759), Japan (760), Korea (766), Netherlands Antilles (791), Panama (811), Surinam (843), Taiwan (858), Trinidad (859), Venezuela (871)	Low Voltage
6952311	Argentina (613), Australia (616), New Zealand (796),	High Voltage
6952320	Indonesia (749)	High Voltage
6952356	Hong Kong (738), Singapore (834), Malaysia (778)	High Voltage
6952374	Chile (655)	High Voltage

- Publications Language Group: No specify code is required. Country default language will automatically be supplied if no language is specified (see Country Language Defaults listed below).

Item #	Country
6952300	Canada<

Specify Code	Language
0055	Japan English
0060	Spanish

- The Country Defaults for publications language are as follows:

Country	Language
Japan	Japanese
All other countries	English<

(Canada only> Orders for a 6151 models 10, 15, 115 and 6150 models 20, 25 125 should specify the appropriate system unit part numbers as well as a line cord (P/N 6952300), keyboard (P/N 1392366), H.M.S. manual (P/N 74X9953 for 6151 system units, P/N 74X9951 for 6150 system units) and the documentation ship group (P/N 75X1023).

In addition, the Options documentation ship group (P/N 75X1105), available in July, 1987, is required for the following products:

Description	P/N
6151 Model 115	79X3944
6150 Model 125 or B25	79X3928
Megapel Display Adapter	6247658
4MB Fast Memory	61X7004
8MB Fast Memory	61X7008
70MB Ext. ESDI Disk Drive	79X3988
Small Computer Systems	
Interface Adapter	61X7000
SCS1 Adapter Cable	79X3468
SCS1 Device-to-Device Cable	79X3470
New Model Series Upgrade Kit	61X6833
Enhanced Floating Point	
Accelerator	61X6815
Token Ring Network Adapter	69X8142*
Host Interface Adapter	6247893*
DCA/TCA 3278/79 Adapter	8665789*

* An Interim Options documentation ship group (P/N 75X1063) will be available in April, 1987, for the Token Ring Network Adapter, the Host Interface Adapter, and the DCA/TCA 3278/79 Adapter. Orders for these adapters after June, 1987, however, should specify P/N 75X1105 for the options documentation ship group.

Low Voltage: 110V AC (90-137V), 50/60 Hz, UL/CSA Safety Mark.

SPECIAL FEATURES

Keyboard: Provides a 102-key keyboard for use with the 6151. Keyboard may be connected to the 6151 System Unit by an attached 2.5m (8.2 ft) cable provided with keyboard, permitting a variety of workspace configurations. Keyboard has 102 keys, 30 mm height, and adjustable tilt. Commonly used data and word processing functions are provided, along with separate typewriter and numeric keypads. Cursor keys, arranged in an inverted "T" pattern, are independent of numeric keys. Key-location enhancements and Light Emitting Diode (LED) mode indicators (Cap Lock, Insert Mode, Scroll Lock) improve keyboard usability. Special Symbols may be accessed with a combination of keys. Twelve National Language Keyboards are available. Order desired National Language keyboard from list below:

Keyboard Language:

Feat. Code	Keyboard Language
----	-----
(Except Canada>	
1258	English UK
1256	English US
1264	French
1257	German
1260	Spanish
1268	Italian
1267	Swedish/Finnish
1266	Norwegian
1271	Belgian French/Dutch
1254	Swiss French/German
1265	Danish
1259	Portuguese<

P/N	Keyboard Language
---	-----
(Except Canada>	
1392366	English US
1392373	Canada
	(Canadian French)<

Limitation: Only one keyboard may be attached to the 6151 System Unit at one time. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Computer AT 512KB Memory Expansion (P/N 6450203): Adds 512KB memory on the I/O bus. Memory is accessible by either 6151 Processor or IBM RT PC Personal Computer AT

Co-processor Option, but is primarily used to support higher performance of the Co-processor. Memory address segment is switch selectable. Packaged as a circuit card to plug into a 16-bit expansion slot in the 6151. Technical Information: Performance characteristics are same as for other Personal Computer AT Memory -- When used with the Co-processor (P/N 6294756) this memory enhances co-processor performance over that of co-processor using 6151 main memory -- 16-bit data path -- Parity byte per error detection. Required for optimal performance of the Co-processor option (6294756) if system memory is less than 2MB. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Computer AT High Capacity Diskette Drive (P/N 6450206): Provides a second high capacity (1.2MB) diskette drive (one high capacity drive is standard Drive is half-high, 5-1/4 inch, dual-sided, and uses the new 96-TPI high density media to record up to 1.2MB of data or programs. The 6150 may use this drive to read 48 TPI media from the IBM PCjr, IBM Personal Computer, IBM Personal Computer XT, IBM Portable Personal Computer or IBM Personal Computer AT. The High Capacity Drive can also write on this media. However, once the 48 TPI media has been written in this drive, it may only be readable on another High Capacity Drive. Technical Information: 512 bps -- 15 sectors per track -- 96 tracks per inch -- 80 tracks per surface -- 360 RPM -- 98 ms average access time in 96 TPI mode -- supports both 300 and 500 K bits/second data transfer rates. Maximum: One (in addition to standard high capacity drive on 6151). Field Installation: Yes. Prerequisites: None (adapter is standard on 6151). Customer Setup: Yes.

IBM Personal Computer AT Math Co-processor (P/N 6450211): Provides a numeric processor extension with floating point, extended integer, and BCD data types. When installed with Feature #4756, IBM Personal Computer AT Co-processor, the Math Co-processor operation conforms to the Proposed IEEE Floating Point Standard (Version 8.0). Technical Information: 4.0M Hz clock speed -- protected virtual address mode -- floating point, extended integer, BCD data support. Maximum: One. Field Installation: Yes. Prerequisites: IBM Personal Computer AT Co-processor, (P/N 6294756) (The Math Co-processor is installed in a socket in the IBM Personal Computer AT Co-processor card.) Customer Setup: Yes.

IBM PC Network Adapter (P/N 6450213): The IBM PC Network Adapter is an option card for connecting the 6151 to the IBM PC Network, with IBM Personal Computers, IBM Personal Computer XTs, IBM Portable Personal Computers or IBM Personal Computer ATs. Each 6151 requires one IBM PC Network Adapter card, which is supplied with a three meter attachment cable. The IBM PC Network Adapter card plugs into either an 8-bit or 16-bit expansion slot. This cable can be connected directly to the IBM PC Network and it's associated translators, expanders and cable kits. Limitation: Customer supplied software is required for proper utilization. Although data from the IBM PC Network Adapter may be received by the 6151 via both programmed I/O operations and Direct Memory Access, data may not be sent to the Adapter via Direct Memory Access. Maximum: One per 6151 System. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Computer AT Serial/Parallel Adapter (P/N 6450215): Provides a parallel port and an RS-232-C serial port. It occupies one feature slot of either the 8-bit or 16-bit types. The serial portion is fully programmable and supports asynchronous communication from 50 to 9,600 bits per second. It offers the same subset of the EIA RS-232-C interface which is provided by the IBM Personal Computer Asynchronous Communications Adapter Card, but on a 9-pin external connector. The parallel portion of the adapter provides the ability to attach various devices that accept 8-bits of parallel data, and provides the equivalent interface to the IBM Personal Computer Printer Adapter Card. Limitation: If the IBM Monochrome Display and Printer Adapter (#4900) (1504900) is installed, two Serial/Parallel Adapters may be installed, but only one of the parallel ports may be used. Maximum: Two. Field Installation: Yes. Customer Setup: Yes.

IBM PC Enhanced Graphics Adapter (#1250) (1501250): Provides support for attachment of the 5154 Personal Computer Enhanced Color Display. In addition, it provides enhanced graphics support for the Monochrome Display. The base option contains 64KB of expandable graphics memory which supports four colors. The option

can be inserted in an 8-bit expansion slot. (Must be installed in the 8-bit slot in the 6151 Mdl 10 if the memory expansion card is used.)

An optional IBM PC Graphics Memory Expansion Card (#1251) (1501251) is available to increase memory to 128KB and increase the color graphics support to 16 colors. A Memory Expansion Kit (#1252) (1501252) increasing memory to 256KB may be also added to this card to support smooth scrolling, panning and more pages of graphics data. Limitation: Only two display adapters of any kind may be attached to the 6151 System Unit (the two adapters must be different). Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes. Supports national language characters contained in the base PO code page (PC code page 437) only.

IBM RT PC Four-Port Asynchronous RS-232-C Adapter (Buffered) (#1356): (Replaces #4763, which will be NO LONGER AVAILABLE after general availability of this feature.) Adapter provides a subset of the EIA RS-232-C interface signals on each of four 10-pin connectors for the independent attachment of ASCII terminals, asynchronous modems, or serial devices like plotters and printers (supports attachment of 3812 PagePrinter and/or 4201 Proprinter with Serial Attachment (#3000)). Adapter provides sixteen-byte buffers on both the send and receive paths of each port to facilitate high throughput, and can offer improved performance for systems supporting relatively large numbers of terminals. Maximum data rate supported is 19.3K bps over a 50-foot distance. This adapter may coexist in an RT PC with the RT PC Four-Port Asynchronous RS-422-A Adapter (#4764), the RT PC Four-Port Asynchronous RS-422-A Adapter (Buffered) (#1357), the RT PC Four-Port Asynchronous RS-232-C Adapter (#4763), and the RT PC 5080 Peripheral Adapter (#7561). Each adapter requires an available 16-bit feature slot. Limitations: The total number of these five types of adapters (#4763, #4764, #1356, #1357 and #7561) may not exceed four per RT PC system. Maximum: Four. Field Installation: Yes. Customer Setup: Yes.

IBM RT PC Four-Port Asynchronous RS-422-A Adapter (Buffered) (#1357): (Replaces #4764, which will be NO LONGER AVAILABLE after general availability of this feature.) This adapter provides a subset of the EIA RS-422-A interface signals on each of four 6-pin connectors for the independent attachment of ASCII terminals. This adapter provides sixteen-byte buffers on both the send and receive paths of each port to facilitate high throughput, and can offer improved performance for systems supporting relatively large numbers of terminals. The maximum data rate supported is 19.2K bps over a distance up to 4,000 feet. (User-supplies surge suppressor required if distance is greater than 400 feet.) The interface cable should not be installed outdoors. This adapter may coexist in an RT PC with the RT PC Four-Port Asynchronous RS-422-A Adapter (#4764), the RT PC Four-Port Asynchronous RS-232-C Adapter (#4763), the RT PC Four-Port Asynchronous RS-232-C Adapter (Buffered) (#1356), and the RT PC 5080 Peripheral Adapter (#7561). Each adapter requires an available 16-bit feature slot. Limitations: The total number of these five types of adapters (#4763, #4764, #1356, #1357 and #7561) may not exceed four per 6151 system. Maximum: Four. Field Installation: Yes. Customer Setup: Yes.

4MB Memory Expansion (P/N 61X6156): Increments system memory by 4MB on the 6151 (any model). Packaged on a card which plugs into an additional memory slot in the 6151. Technical Information: Divided into two "arrays" of 2MB each -- 32-bit data path plus 8-bit ECC -- uses interleaving to overlap memory accesses -- 170 nsec effective memory card cycle (23.5 megabytes per second). Limitation: 4MB Memory Card must occupy memory slot #1 when used with either 1MB or 2MB Memory Cards. Maximum: One additional. Field Installation: Yes. Prerequisites: An available memory slot in the 6151. Customer Setup: Yes.

IBM Token-Ring Network RT PC Adapter (P/N 69X8142): The IBM Token-Ring Network RT PC Adapter provides physical attachment of the 6150 Model 020, 25, A25 and/or 6151 Model 010 to an IBM Token-Ring Network. The network uses the IBM Cabling System, including Type 3 specified telephone media for physical connection and a token-ring access protocol for network traffic control. Detailed information on the IBM Token-Ring Network is provided in the Product Announcement

Highlights:

- Provides connection of the RT PC to the IBM Token-Ring Network.
- Conforms to the IEEE standard 802.5 and ECMA standard 89 for token-ring, baseband local area networks.
- Network intelligence resident in adapter, providing significant network management capability.
- 16K bytes of RAM.
- Selectable DMA levels.
- Burned in addresses.
- Up to two adapters per system.

The adapter is a feature card for the 6150 Model 020, 025, A25, and 6151 Model 010 System Units. Refer to the announcement letter for additional information.

The adapter contains a microprocessor operating under control of adapter resident microcode. The adapter connects the RT PC to an IBM Token-Ring Network which operates at a speed of four million bits per second using protocols conforming with IEEE 802.5 and ECMA 89 standards.

Significant reliability, availability, and serviceability functions are built into the adapter and microcode. Diagnostics invoked during adapter initialization verify the adapter operation and check-out the cabling to the access unit. The adapter detects permanent errors, such as loss of receive signal, and generates a notification signal to initiate automatic network recovery. Recoverable errors, such as bit errors in the transmitted message, are detected by the adapter for subsequent reporting to a ring diagnostic program.

RT PC diagnostic diskettes contain an advanced diagnostic program for service personnel use in isolating faults to the adapter, the adapter attachment cable, or the remainder of the network.

A ring diagnostic program is used in an IBM Personal computer as an aid in problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented.

A publication is provided with the adapter to aid the user in operation, installation, and problem determination: IBM Token-Ring Network RT PC Technical Reference (SK2T-0291).

An attachment cable is required for connecting the adapter to the network cabling system. The IBM Token-Ring Network RT PC Adapter cable is a 2.4m (8 ft.) attachment cable used to connect the adapter to data grade media. The Type 3 Media Filter includes a 2.4m (8 ft.) cable and is used to connect the adapter to Type 3 telephone media. (See the Product Announcement letter dated 10/15/85).

Publications: The following publication is available through your local IBM branch office: IBM Token-Ring Network RT PC Adapter Installation, Setup and Service. (Contains a detailed description of the adapter operation and programming interfaces.)

The following technical reference manual is available from IBM Direct and can assist vendors in developing hardware and software products for attachment to the IBM Token-Ring Network: IBM Token-Ring Network Architecture Reference (6165877). (Contains a detailed description of the IEEE 802.5 token-ring access protocol and the IEEE 802.2 logical link control as implemented for the IBM Token-Ring Network.)

The Locally Attached Personal Computers (G4000) course has been updated to include information on the IBM Token-Ring Network. The IBM Cabling System Planning (G3644) and IBM Cabling System Layout and Physical Installation (G3648) courses have been updated to include planning and installation information for the multi-station access unit for Type 3 telephone media accessories. Call IBM Direct for course locations and schedules.

Hardware Requirements: An operational token-ring network consists of cabling, access units, and attaching devices. Each attaching device requires a network adapter.

For attachment of a 6150/6151 to the network, the IBM Token-Ring Network RT PC Adapter must be installed in either a 6150 Model 020, 025, or a 6151 Model 010.

The recommended minimum network should consist of at least one IBM Personal Computer with an IBM Token-Ring Network Adapter and a ring diagnostic program installed to facilitate Token-Ring Network problem determination.

Software Requirements: This adapter is intended to be used only in an RT PC hardware environment with an AIX(TM) Operating System Version 1.1. In addition, the user must develop or acquire appropriate VRM/AIX software that specifically supports this adapter. An adapter level program supporting the desired function must be available and be downloaded to the adapter before it can become operational.

(TM) AIX is a trademark of IBM.

Security, Auditability, and Control: User management is responsible for evaluation, selection, and implementation of security features, for administrative procedures, and for appropriate controls in application systems.

Data transmitted on the network passes through each network attaching device adapter. Users may wish to take the added security precaution of encrypting sensitive information before it is transmitted.

Lighted Program Function Keyboard (P/N 6248425): Is a compact, 32-key device which may be used to initiate application defined functions with a single keystroke. Amber-colored LED's imbedded in the keytops are turned on and off by the application to signal to the user which keys may be selected at a given moment. The device is supplied with a 1.1 meter cable which plugs into the 5080 Peripheral Adapter (P/N 6487561) via an attachment cable kit (P/N 6487564). Cable length total is 2.4m (7.8 ft.). The 5080 Peripheral Adapter supplies DC power to the keyboard. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

2MB Memory Expansion (P/N 6294739): Increments system memory by 2MB (two million bytes) on 6151 Mdl 010. Packaged as a circuit which plugs into memory slot in 6151. Technical Information: Divided into two "arrays" of 1MB -- 256K X 1 DRAM modules -- 32-bit data path plus 8-bits ECC -- uses interleaving to overlap memory accesses -- 170 nsec effective memory cycle (23.5 megabytes/second). Limitation: If a 1MB and a 2MB Memory Card are used together in a 6151, the 2MB card must occupy memory slot #1. Maximum: One additional (may also be used to replace the standard 1MB memory card on the Mdl 010 for a total of 4MB). Field Installation: Yes. Prerequisites: An available additional memory slot on the 6151. Customer Setup: Yes.

Personal Computer AT Co-processor Card (P/N 6294756): Provides for execution of many IBM PC and IBM Personal Computer AT programs concurrent with and under control of the 6151 main processor. With appropriate program support (the Personal Computer AT Co-processor Services licensed program, (P/N 55X8903), the option enables the 6151 to emulate the IBM Personal Computer AT Mdl 068 and 099. Performance will be better than that of the IBM PC XT (in general) but less than that of the IBM Personal Computer AT. Application execution is concurrent with 6151 program execution. Technical Information: 3 channel timer/counter -- 16 level interrupt controller -- 6M Hz processor -- expanded diagnostics using 6151 capabilities. Limitations: Must be installed in I/O option slot #5. May be used in conjunction with optional IBM Personal Computer AT Math Co-processor Feature (P/N 6450211) and IBM Personal Computer AT 512KB Memory Expansion Option (P/N 6450203). Requires either 2MB or more of system memory, or IBM Personal Computer AT 512KB Memory Expansion (P/N 6450203) for satisfactory performance. Maximum: One. Field Installation: Yes. Prerequisites: I/O option slot #5, and the Co-processor Services LPP (P/N 55X8903). A dedicated PC display (5151 or 5154) is recommended for improved performance. Customer Setup: Yes. Supports national language characters contained in the base PO code page (PC code page 437) and supported by DOS "KEYBXX" only.

Floating-Point Accelerator (P/N 6294758): Provides circuitry to support both single (32-bit) and double (64-bit) precision floating-point operations using 32 sets of 14 registers (32-bits each) provided on the feature. Provides significant performance improvement for floating-point calculations. Supports the format and basic oper-

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ations defined by the ANSI/IEEE 754-1985 Binary Floating-Point Standard. Circuitry packaged as a card which plugs into a special slot (slot B) on the 6151 system board. Technical Information: Supports add/subtract/multiply/divide/compare -- supports conversion between single and double precision, and between floating point and integer formats -- supports additional operations negate and absolute. Maximum: One. Field Installation: Yes. Prerequisites: The Advanced Interactive Executive Operating System (P/N 55X8994) is required to support the additional IEEE 754 operations and exception handling. Customer Setup: Yes.

IBM Personal Computer 3278/79 Emulation Adapter (P/N 8665789): Provides a coaxial connection between an RT PC and a 3174/3274 Display Control Unit, or between an RT PC and the integrated display/printer adapter of either the 4331 Processor or the 4361 Processor. The adapter provides the "handshaking" between the two units. Customer-supplied cabling is required. Host programming is required for host interactive applications. Consult the current RT PC software offerings for 3270 software emulation available. Maximum: One adapter per system. Field Installation: Yes. Customer Setup: Yes.

IBM RT PC ADVANCED FLOATING-POINT ACCELERATOR (P/N 61X6815): Provides capability to support both single (32-bit) and double (64-bit) precision floating-point operations using multiple sets of registers provided on the feature. Provides significantly improved performance over the IBM RT PC Floating-Point Accelerator (P/N 6294758). Advanced Floating-Point Accelerator (P/N 61X6815) is microcoded to be compatible with Floating-Point Accelerator (P/N 6294758) so existing applications may be executed without change. Supports the operations and basic format defined by the ANSI/IEEE 754-1985 Binary Floating-Point Standard. Circuitry packaged as a card which plugs into a special slot (Slot B) on the RT PC system board.

Technical Information: Supports add/subtract/multiply/divide/compare -- supports conversion between single and double precision, and between floating-point and integer formats -- supports additional operations "negate" and "absolute" -- supports transcendental functions. Includes 2,048 32-bit words of random access memory for internal data storage and floating-point registers. Includes 4,096 words of random access memory (not user addressable) for microcode storage. Limitations: Cannot be installed concurrently with the IBM RT PC Floating-Point Accelerator (P/N 6294758). Maximum: One. Field Installation: Yes. Prerequisites: The RT PC Advanced Interactive Operating System (AIX), Version 2.1 (P/N 92X1324) is required to support this feature. The microcode is loaded into the Advanced Floating-Point Accelerator memory by the AIX Operating System, Version 2.1 at IPL-time. Also requires an available floating-point accelerator slot (Slot B). Customer Setup: Yes.

(Canada only > IBM RT PC Multi-Protocol Communications Adapter (#4762, P/N 6294762): The IBM RT PC Multi-Protocol Communications Adapter is designed as a single-slot (16-bit) multiple adapter for attaching a variety of data communications equipment to the IBM RT PC. The adapter will accommodate three physical interfaces and can be programmed to support a variety of protocols. The adapter contains a high-performance Intel 80C51 microcontroller with 8Kb of adapter memory. Also provided are adapter diagnostics, bootstrap loader, and other advanced features.

This adapter can be appropriately programmed to provide the following capabilities:

- Two port concurrency supported on a single adapter
- Two adapter concurrency supported in a single RT PC system (providing up to four concurrent communications ports)
- Data rates up to 64,000 bps with external clocking and up to 19,200 bps with internal clocking
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support

This offering also includes:

- Card-edge diagnostic wrap connectors (2)
- Customer diagnostics
- ROM-based bootstrap loader

The Multi-Protocol Communications Adapter has been designed for and is compatible with the 6150 mdls 020, 025, A25 and the 6151 mdl 10. This adapter includes many advanced features which provide enhanced performance and flexibility. These features include the following:

- Advanced high-performance Intel 80C51 microcontroller
- 8Kb of adapter memory
- Data transfers via Direct Memory Access
- 16-bit DMA data transfer width
- Adapter resident 4-channel alternate DMA controller
- Two selectable interrupt levels
- Shared interrupt level support
- Two selectable system DMA channels
- Two selectable adapter I/O address spaces
- Zilog 8530A Serial Communications Controller
- Three physical adapter ports
- Internal Business Machine Clocking (BMC) up to 19,200 bps
- CRC generation and checking

The Multi-Protocol Communications Adapter can be connected to a variety of data communications devices. It provides the capability of off-loading a significant portion of the real time communications processing from system's central processor thus providing a dedicated multi-port communication subsystem for data communications applications.

The Multi-Protocol Communications Adapter is based on a high-performance, 8-bit Intel 80C51 microcontroller. This adapter provides two independent serial communications ports that operate at speeds up to 64,000 bps using direct memory access. Three physical ports are present on the Multi-Protocol Communications Adapter. While all three ports can be connected to external data communications devices, only two adapter ports can be actively transferring data at any time.

Two port concurrency is supported at data rates up to 19,200 bps using either the asynchronous communications protocol (either half-duplex or full-duplex) or any half-duplex synchronous communications protocol. Single port operation is supported at data rates up to 19,200 bps for full-duplex synchronous protocols, and up to 64,000 bps for half-duplex bit synchronous protocols. Actual realized performance is dependent on the functionality supported by the user provided adapter level programming implementation and the general level of RT PC system activity at execution time.

Any adapter port can be programmed for asynchronous, bit synchronous, or character synchronous protocols. Any adapter port can be programmed to operate at data rates up to 64,000 bps. For operation at data rates in excess of 19,200 bps on either adapter port one or adapter port two, the length of the external device cable is a consideration. In these circumstances the use of the EIA RS-232-C/CCITT V.24/V.28 Modem Attachment Cable (#4812) is specifically recommended.

Note: The adapter's functionality as presented in a communications application running on the RP PC's main processor is dependent on the design characteristics of the 80C51 adapter level program that is provided by the user. The native adapter and its firmware provide a set of tools and procedures to facilitate the downloading of such a program into the adapter's RAM memory space. The downloaded 80C51 adapter level program must be designed to provide the appropriate communication function and control adapter level communication activities.

Communications between the Multi-Protocol Communications Adapter and the systems unit are done via I/O ports and DMA data transfers. Communication is synchronized by interrupts between the Multi-Protocol Adapter and the systems unit. Interrupt levels are selectable and can be shared with other adapters that provide interrupt sharing support.

Detailed technical information on the Multi-Protocol Communications Adapter is provided in the optional "RT PC Technical Reference".

Optional Features:

Modem Cable - RS-232-C (16 Pin) (P/N 6294812): Allows the user to connect one port of the Multi-Protocol Communications Adapter to a modem via a plug at the rear of the systems unit. The cable is

shielded and is 3m (approximately 9.75 ft.) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable. This cable meets the EIA RS-232-C and CCITT V.24/V.28 specifications.

Autocall Unit Cable (P/N 6294814): Allows the user to connect one port of the Multi-Protocol Communications Adapter to an autocall unit via a plug at the rear of the systems unit. The cable is shielded and is 3m (approximately 9.75 ft.) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable. This cable meets the EIA RS-366 and CCITT V.25/V.28 specifications.

Modem Cable - X.21 (P/N 6294816): Allows the user to connect one port of the Multi-Protocol Communications Adapter to an X.21 modem via a plug at the rear of the systems unit. The cable is shielded and is 3m (approximately 9.75 ft.) long. The cable terminates in a 15-pin male connector. A wrap connector is provided to test the cable. This cable meets CCITT X.21 specifications.

Publications: The following related publications are available for purchase:

- IBM RT PC User Setup Guide (SV21-8020)
- IBM RT PC Guide To Operations (SV21-8021)
- IBM RT PC Problem Determination Guide (SV21-8022)
- The appropriate maintenance manual:
 - IBM 6151 Model 010 Hardware Maintenance And Service (SV21-8026)
 - IBM 6150 Model 020 and Model 025 Hardware Maintenance And Service (SV21-8025)
- IBM RT PC Hardware Technical Reference (SV21-8024). The Multi-Protocol information in this publication includes:
 - Hardware Technical information
 - ROS firmware description
 - Adapter level programming information
 - Sample adapter level program listing

These publications will be ordered and updated via the System Library Subscription Service (SLSS). Additional publications orders will be accepted by IBM Direct.

Customer Setup: The IBM RT PC Multi-Protocol Communications Adapter is designated "Customer Setup" (CSU).

Customer Responsibility: The customer must acquire appropriate communication software that specifically supports the IBM RT PC Multi-Protocol Communications Adapter or develop his own communication software.

The customer is additionally responsible for:

- Adequate site and system planning and preparation.
- Ordering appropriate attachment features.
- Physical setup, connection of cables, and checkout.
- Using and following the problem determination procedures prior to calling for service.

Packaging: The IBM RT PC Multi-Protocol Communications Adapter is packaged in a carton containing the adapter, warranty information, and diagnostic wrap connectors (2). <

4-Port Asynchronous RS-232-C Adapter (P/N 6294763): This adapter provides a subset of the EIA RS-232-C interface signals on each of four 10-pin connectors for the independent attachment of either ASCII terminals, asynchronous modems or serial printers, such as the Pageprinter 3812 or 4201 Proprinter with serial interface (P/N 6493187). Maximum data rate supported is 19.2K bps over a 50 foot distance. This adapter may coexist in a 6151 with the 4-Port Asynchronous RS-422-A Adapter (P/N 6294764) and the 5080 Peripheral Adapter (P/N 6487561). Each adapter requires an available 16-bit I/O slot. Limitations: The total number of these three types of adapters may not exceed three per 6151 System. Maximum: Three. Field Installation: Yes. Customer Setup: Yes.

4-Port Asynchronous RS-422-A Adapter (P/N 6294764): This adapter option provides a subset of the EIA RS-422-A interface signals on each of four 6-pin connectors for the independent attachment of ASCII terminals. Maximum data rate supported is 19.2K bps over a distance up to 4,000 feet (user supplied surge suppressor required if over 122 meters). The interface cable should not be installed

outdoors. This adapter may coexist in a 6151 with the 4-Port RS-232-C Adapter (P/N 6294763) and the 5080 Peripheral Adapter (P/N 6487561). Each adapter requires an available 16-bit slot. Limitations: The total number of these three types of adapters may not exceed three per 6151 System. Maximum: Three. Field Installation: Yes. Customer Setup: Yes.

Advanced Monochrome Graphics Display Adapter (P/N 6294765): Provides the bit mapped display adapter required to attach the 6153 Advanced Monochrome Graphics Display to a 6151 System Unit. The adapter is on a single card requiring a 16-bit I/O slot in the 6151 System Unit. This All-Points-Addressable (APA) design features a 1024 x 512 bit map on the adapter card which is directly addressable by the system microprocessor. Viewable area of 720 x 512 pels is supported, with the remaining bit map usable for fonts or workspace. Hardware assist on the card provides data alignment of both text and graphics to the pel level. Alphanumeric text characters are treated as graphic symbols by the hardware, and can therefore be tailored to any shape, size or style desired. Overlay operations are assisted by a programmable Write Mask. Limitation: Only two display adapters of any kind per 6151 System Unit (the two adapters must be different). Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes.

Advanced Color Graphics Display Adapter (P/N 6294766): Offers an adapter for attachment of the 6154 Advanced Color Graphics Display. The adapter features a 1024 x 512 x 4 bit map, and includes all functions of the Advanced Monochrome adapter above and also provides hardware support for the display of 16 simultaneous colors from a palette of 64 colors. A viewable area of 720 x 512 pels is supported, with the remaining bit map usable for fonts storage or workspace. Additional hardware assist helps improve display response times. The adapter card requires one 16-bit feature slot in the 6151. Limitations: Only two display adapters of any kind per 6151 System Unit (the two adapters must be different). Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes.

Extended Monochrome Graphics Display Adapter (P/N 6294768): Provides a high performance, high resolution, bit mapped adapter for connection of the 6155 Extended Monochrome Graphics Display to a 6151 System Unit. The adapter is packaged on a single card, which requires a 16-bit I/O slot in the 6151 System Unit. The adapter features a 1024 x 1024 bit map, and is directly addressable by the system processor. A viewable area of 1024 x 768 pels is supported, with most of the remaining bit map usable for font storage. Adapter hardware provides significant system off-load as well as fast front of screen response. A high level interface is presented to the system processor. The hardware architecture of the adapter supports a very fast rectangular area move, copy, merge, fill, rotate, and replace, as well as logical operations and line drawing. Hardware cursor support is also provided. The adapter contains a high performance list processor which executes primitives from an on-card queue. Hardware assist on the card provides data alignment to the pel level in either vertical or horizontal orientation. Alphanumeric text characters are treated as graphic symbols by the hardware, and can therefore be tailored to a variety of shapes, sizes or styles as desired. Limitations: Only two display adapters of any kind per 6151 System Unit (the two adapters must be different.) Maximum: One adapter. Field Installation: Yes. Customer Setup: Yes.

Streaming Tape Drive Adapter (P/N 6294797): Provides a QIC-02 (Quarter Inch Cartridge) tape interface to the 6151. It supports the attachment of the 6157 Streaming Tape Drive, which provides for data interchange capability between all models of the 6150 and 6151, as well as for fixed-disk backup and restore at rates up to 4MB/min in image dump mode. Packaged as a circuit card requiring a 16-bit feature slot in the 6151 system unit. Provides a 37 pin 'D' shell male external connector. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Monochrome Display and Printer Adapter (P/N 1504900): Supports attachment of the 5151 Monochrome Display (5151001) and/or the 5152 Graphics Printer (5152001) (discontinued), the 4201/001 Proprinter, or the 5201/001 Quietwriter Printer. Limitations: Only two display adapters of any kind may be attached to the 6151 System Unit (the two adapters must be different). This option may be installed in only one of the two 8-bit feature slots (slot #1). Maximum: One adapter cable. The Printer Cable (P/N 1525612) is available to

connect one of the above printers to the adapter. Field Installation: Yes. Customer Setup: Yes. National language character support is limited by the device attached.

IBMRT PC Baseband Adapter (P/N 61X6810): The IBM RT PC Baseband Adapter for use with Ethernet(TM) provides a connection for all models of the RT PC to a 10 Megabit Carrier Sense Multiple Access/Collision Detection (CSMA/CD) Ethernet Network. The adapter contains a memory mapped system interface and jumpers to move the memory address space and interrupt level.

The adapter attaches to the network via standard multiwire cable which is connected to a CSMA/CD transceiver. Network cabling and transceivers may be obtained from numerous vendors. Highlights are:

- Allows use of the RT PC Interface Program LP for connection to Ethernet type networks
- 16K bytes of RAM for data buffering
- Selectable interrupt levels
- Timer interrupt
- Selectable RAM addresses
- Standard 15-pin network connector
- Uses either thick or thin cable
- Will plug into either the 8-bit or 16-bit slots
- Up to two Adapters can be plugged in the same IBM RT PC

(TM) Ethernet is a trademark of Xerox, Inc.

The Baseband Adapter is a feature card for all 6150 and 6151 models. The adapter contains 16K bytes of internal RAM which allows independent buffering from transmit and receive frames in order to improve performance. The adapter may be attached to either "thick" or "thin" Ethernet type networks by choosing the appropriate third party supplied cable and transceiver.

Publications: Setup and installation instructions for the adapter are contained in the "IBM 6150 Micro Computer User Setup Guide and Options Installation", SV21-8020. The customer is responsible for following the problem determination procedures in the "IBM 6150 Micro Computer "Problem Determination Guide," SV21-8022 before calling their point of sale for service.

Hardware Requirements: The Baseband Adapter will plug into any model of the 6150 and 6151 system units.

Software Requirements: This product requires that the IBM RT PC AIX Operating System Version 1.1 (59X8994) be installed.

Limitations: The Baseband Adapter must NOT be plugged into slot eight on the 6150 models 20, 25, and A25, or slot five on the 6151 model 10.

Planar must be at, or higher than EC# A39735H on the RT PC Models 020, 25, A25, or EC# A31283M on the 6151 Model 10.

Security Auditability and Control: The RT PC can be used and managed so as to limit the risk of unintended modification, destruction, or disclosure of sensitive data. User management is responsible for evaluation, selection, and implementation of security features, for administrative procedures, and for appropriate controls in application systems. If sensitive data is sent over external communication facilities, user management may wish to pursue the application of cryptography. Customer Setup (CSU): Yes.

RT PC Small Computer System Interface Adapter (P/N 61X7000): This adapter, associated cables, and associated software were designed in consideration of the ANSI Standard (X3.131.1986) and support the Mandatory Command Set for disk and tape, as well as selected Optional and Extended Commands for disk and tape (See RT PC Hardware Technical Reference for interface description). This adapter provides the means to attach appropriately designed tape and disk products, including a string of up to seven 9332 Direct Access Storage Devices, either Mdis 250 and/or 450 (stand-alone external DASD), or Mdis 240 and/or 440 (rack-mounted DASD, using the 9309 Rack Enclosure). The adapter is a feature card which plugs into a 16-bit feature slot of any mdl of the 6151. The 9332 Mdis 240, 250, 440, and 450 all employ the Small Computer System Interface and all are external to the RT PC. Models 240 and 250 have a formatted capacity of 200MB, and the Models 440 and 450 have a formatted capacity of 400MB. Within stand-alone or rack models,

different sizes may be intermixed on a string. The Adapter supports the Small Computer System Interface Differential Driver/Receiver interface option and the Alternative 2 Connector. The data transfer between the RT PC and the Adapter uses DMA mode. The Adapter supports burst data rates of up to 3.5MB/second, but effective rates are lower. Limitation: A total of 14 9332 DASD of up to 400MB each may be attached to the RT PC using two Adapters, for an attached storage total of 5.6GB. The I/O performance using the RT PC Small Computer System Interface Adapter and the 9332 DASD is dependent upon the system configuration and the number and types of tasks being performed. Maximum: Two adapters per RT PC. Field Installation: Yes. Customer Setup: Yes.

Note: Signal cables are supplied as no charge items (one per 9332) along with the 9332 DASD order. See M9332 pages. Additional cables may be ordered with the RT PC as charge items (see "Accessories").

IBM RT PC 4MB Fast Memory Expansion (P/N 61X7004): This option increases the system memory of a Model 115 by 4MB. Up to two 4MB Fast Memory cards can be added to the system to supplement the standard 4MB of fast memory on the Advanced Processor Card. The Fast Memory Expansion option cards plug into dedicated memory card slots in the system. 4MB and 8MB Fast Memory cards can be used in combination in the two slots so long as the system total does not exceed 16MB, including the 4MB on the processor card.

Memory is divided into two arrays of 2MB each with interleaving to overlap memory access and achieve the equivalent of 100-nanosecond cycle time. Four data bytes and one error correcting code (ECC) byte are transferred at a time over a 32-bit data path plus 8-bit ECC. Limitations: Not available for 6151 Models 010 or 015. Must be plugged in one of two memory slots. Maximum system memory may not exceed 16MB, including the 4MB standard memory on the Advanced Processor Card. Maximum: Two per system. Field Installation: Yes. Prerequisites: Available memory slot. Customer Setup: Yes.

IBM RT PC 8MB Fast Memory Expansion (P/N 61X7008): This option increases the system memory of a Model 115 by 8MB. Only one 8MB Fast Memory Expansion options may be added to the system, either alone or in combination with the 4MB Fast Memory Expansion option. Fast Memory Expansion cards plug into two dedicated memory slots in the system. 4MB and 8MB Fast Memory cards may be used in combination in these two slots so long as the system total does not exceed 16MB, including the 4MB on the processor card.

Memory is divided into two arrays of 4MB each with interleaving to overlap memory access and achieve the equivalent of 100-nanosecond cycle time. Four data bytes and one error correcting code (ECC) byte are transferred at a time over a 32-bit data path plus 8-bit ECC. Limitations: Not available for 6151 Models 010 or 015. Must be plugged in one of two memory slots. Maximum system memory may not exceed 16MB, including the 4MB standard memory on the Advanced Processor Card. Maximum: One per system. Field Installation: Yes. Prerequisites: Available Memory Slot. Customer Setup: Yes.

5080 Peripheral Adapter (P/N 6487561): This adapter provides for the attachment of the Lighted Program Function Keys (P/N 6246799) and the Dials (P/N 6248436). This optional 3-port card plugs into a 16-bit slot on the 6151. The interface has been modified to provide an RS-232-C subset, (XON/XOFF protocol only) as well as DC power to the attached devices. Modem control lines have been pre-conditioned on the adapter so that a plotter may be attached to any port using the XON-XOFF pacing protocol and the same printer/plotter cable used for attachment to the 4-Port Asynchronous RS-232-C Adapter. Limitations: The total number of this adapter and the 4-port RS-232-C Adapters (P/N 6294763) plus the 4-port RS-422-A Adapters (P/N 6294764) may not exceed three per 6151 System. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Megapel Display Adapter (P/N 6247658): Is a high-resolution display adapter which provides a direct connection for the 5081 Model 11, 12, 16 or 19 displays or the 5082 Projection System to an RT Personal Computer system unit (any model). (Note: Feature Code #2001 is required on 5081 Display for attachment to Megapel Adapter.) The Adapter allows the attached monitor to function both

as the application display and the system operator console. (Note: The monitor attached to the Megapel Adapter is not supported as an operator console by the PC AT Coprocessor Services Licensed Program or by application programs running in Coprocessor mode. However, a supported display, either the IBM 5151 or the IBM 5154, may be added to the system to provide a console for Coprocessor support.) The Megapel Display Adapter supports 1,024 x 1,024 resolution on its attached display, 256 colors from a palette of 4096 colors for color monitors, or 16 shades of gray on monochrome monitors. The Adapter has a high speed LSI pel processor with Pick and Scissor capability as standard, which provides high speed Vector Draw, BIT/BLT, and Area Fill.

The Adapter is packaged on two linked cards which require two adjacent 16-bit feature slots in the system unit. The Adapter also provides a parallel printer interface identical to the printer interface on the PC Monochrome Display Adapter, thereby eliminating the need for a separate parallel printer adapter and the use of a slot for that purpose. The Adapter includes a six foot signal cable to attach the monitor to the Adapter card.

The Megapel Display Adapter is supported by two application interfaces, graPHIGS* (IBM's Programmer's Hierarchical Interactive Graphics Standard) and GSL (Graphics Support Library). A software prerequisite for Adapter support is either AIX Version 2.1 or VRM Version 2.1.

Limitations: Limited to one Megapel Display Adapter per RT PC System. Requires a minimum of 2MB memory in the RT PC System. Requires two adjacent 16-bit feature slots. Not supported as system console adapter for use with PC AT Coprocessor Feature (P/N 6294756). Can coexist on a 6150 or 6151 system unit with a native display adapter (6153, 6154 or 6155), with a supported PC display (5151 or 5154), and with the 5080 Attachment Adapter (P/N 6247860). Can coexist with Feature Code P/N 1504900, IBM Monochrome Display and Printer Adapter, but only one parallel printer adapter per system may be active. Maximum: One. Field Installation: Yes. Prerequisites: Two adjacent available 16-bit feature slots. (See M5080 pages for corequisites for attached 5081 Display). Customer Setup: Yes.

* graPHIGS is a trademark of International Business Machines Corporation.

S/370 Host Interface Adapter (P/N 6247893): This feature plugs into a 16-bit feature slot in an appropriately configured 6151 (any model). Provides a high-speed link from an 6151 to a S/370 Host via a 5088 Graphics Channel Controller. RT PCs may be attached on a single connection over user-supplied coaxial cable, using up to 16 link addresses. The adapter contains 64K bytes of programmed random access memory to control the link. Nominal link speed is 2M bps. The adapter feature includes the attachment card, required micro-code, and supporting publications. Customer-supplied coaxial cable is required. See physical planning information. Host programming is required for Host Interactive Applications. (Note: The Mode Shared Attachment Feature (#9301) must be installed on the IBM 5088 if the 5088 serial number is below 2000). Maximum: One. Field Installation: Yes. Prerequisites: The RT PC Workstation Host Interface Program running under the RT PC Advanced Interactive Executive (AIX) Corporation Operating System, Version 2.1, is required for support of the connection. Customer Setup: Yes.

1MB Memory Expansion (P/N 6848222): Increments system memory by 1MB (one million bytes) on 6151 Mdl 010. Packaged on a card which plugs into an additional memory slot in 6151. Technical Information: Divided into two 'arrays' of 512KB -- 64K x 4 DRAM Modules -- 32-bit data path plus 8-bit ECC -- uses interleaving to overlap memory accesses -- 170 nsec effective memory card cycle (23.5 megabytes/second). Maximum: One additional. Field Installation: Yes. Prerequisites: An available additional memory slot in the 6151. Customer Setup: Yes.

Dials (P/N 6248436): Provides a set of eight continuous turn cone-like dials in a compact dial unit which can be used to input scalar values so that they can be interpreted by the application program to adjust the image on the screen (operations such as panning, zooming, scaling, or image rotation). The Dials device is supplied with a 1.4m cable which plugs into the 5080 Peripherals Adapter via an attachment cable kit (P/N 6487564). Cable length

total is 2.6m (8.5 ft). 5080 Peripheral Adapter supplies DC power to the dials. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

Mouse (P/N 6294726): Provides a two button mechanical device to provide positioned input for screen pointing and cursor movement on a display screen. Includes 2.5m (8.2 ft) cable, and plugs into a specially keyed locator port on the 6151 Systems Unit, which includes adapter as standard. Limitation: Cannot be used with the 5083 Tablet. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES

New Model Series Upgrade Kit (P/N 61X6833): This kit contains the hardware, software, and instructions necessary to upgrade a model 015 to a model 115. Model 010 may also be upgraded to a model 115, but this upgrade requires that the customer first acquire either a 70MB Extended ESDI Fixed Disk Drive (P/N 79X3988), or a 70MB ESDI Fixed-Disk Drive (#6941) which will be reformatted to the Extended ESDI format during the upgrading process. The kit consists of a New Model Series Advanced Processor Card with new 100 nanosecond cycle CMOS processor, built-in floating-point unit, and 4MB of on-card fast memory; an Extended ESDI Magnetic Media Adapter, an Extended ESDI Magnetic Media Adapter Cable, a Utility Program Diskette with ESDI-to-Extended ESDI Reformatting Utility Program, and Customer Setup Instructions for the Upgrade Kit. Hardware publications updates for the New Series Models and diagnostic diskettes accompany the Upgrade kit in a separate carton.

A corequisite for the Upgrade Kit is AIX Operating System Version 2.1.

Limitations: The Upgrade Kit is only available for sale for the purpose of upgrade of earlier RT PC Models 010, 015, 020, 025, and A25. Limited to one Upgrade Kit per system. See special terms and conditions for Upgrade Kit in Announcement Letter dated January 27, 1987. Note: Upgraded systems to which the Upgrade Kit has been only partially applied, or upgraded/new systems which include components with lesser performance than the components of the new series, will have lower levels of performance. Maximum: One per RT PC System. Field Installation: Yes. Prerequisites: RT PC Model 015, 025, or A25, or RT PC Model 010 or 020 plus either 70MB Extended ESDI Fixed-Disk or 70MB ESDI Fixed-Disk which is to be reformatted to Extended ESDI format. Customer Setup: Yes.

IBM Personal Computer AT Communications Cable (P/N 6450217): Provides a 9-pin 3-meter cable for attaching a modem to the RS-232-C serial port provided on the IBM Personal Computer AT Serial/Parallel Adapter option (P/N 6450215).

IBM Personal Computer AT Serial Adapter Connector Cable 9-Pin (P/N 6450242): Provides a 10-inch 9-pin to 25-pin adapter cable which allows external devices to attach to the serial port on the IBM Personal Computer AT Serial/Parallel Adapter (P/N 6450215).

IBM RT Personal Computer ASCII Terminal Cable - RS-232-C (10/25M-Pin): (P/N 79X3913) This is a 3-meter interface cable for attaching the IBM 316X family of ASCII terminals to any of the ports on the Four-Port Asynchronous RS-232-C Adapter. This cable has a 25-pin male "D" connector for the terminal and a 10-pin connector for the adapter.

Modem Cable - RS-232-C (10-Pin) (P/N 6294704): Provides a 3-meter interface cable for attaching an asynchronous modem to any of the ports on the 4-port asynchronous RS-232-C adapter or to the standard RS-232 ports on the 6150 Base System Unit. This cable has a 25-pin D connector for the modem and a 10-pin modular connector for the adapter.

ASCII Terminal Cable - RS-422-A (6-pin) 20 Meter (P/N 6294802): Provides a 20-meter interface cable for attaching an RS-422-A terminal to the 4-port asynchronous RS-422-A adapter. This cable has

a 25-pin D connector for the terminal and a 6-pin modu connector for the adapter.

Serial Printer Cable (10-Pin) (P/N 6294803): Provides a 3-meter interface cable for attaching a serial printer or plotter to one of the standard RS-232-C ports on the 6150 base system unit or to the 4-port asynchronous RS-232-C Adapter.

PC Printer Cable (P/N 1525612): Provides a 2-meter cable for attaching a printer to the parallel port provided by either the IBM Personal Computer AT Serial/Parallel Adapter option (P/N 6450215) or the Monochrome Display and Printer Adapter option (P/N 1504900).

5080 Peripheral Cable Kit (P/N 6487564): Provides a 1.2m (48 in.) cable which connects the 5080 Peripheral Adapter to the device cable of either of the following options:

- Lighted Program Function Keyboard (P/N 6246799)

The Lighted Program Function Keyboard is equipped with a 1.2m (45 in.) device cable which connects to this cable kit option, resulting in a total cable length of 2.4m (7.8 ft).

- Dials (P/N 6248436)

The Dials device is equipped with a 1.4m (54 in.) device cable which connects to this cable kit option resulting in a total cable length of 2.5m (8.5 ft).

5083 Tablet Cable Kit (P/N 6487586): Provides a 1.4m (55 in.) cable for attaching either of the 5083 Mdl 1 or Mdl 2 Tablets to the locator port of either the 6150 or 6151. The tablet device cable is 1.2m (45 in.), resulting in a total cable length of 2.5m (8.2 ft). (Not required for IBM 5083 Model 11A Cursorpad or Model 12A Tablet - Model 11A and 12A Tablets attach directly to the RT PC Locator Port via a cable attachment ordered with the Tablet. To order an RT PC Cable Kit attachment for the 5083 Tablet Models 11A and 12A (see feature code #4010 in the M5083 pages).

ASCII Terminal Cable - RS-422-A (6-Pin) 3 Meter (P/N 6487641): Provides a 3-meter interface cable for attaching an RS-422-A termi-

nal to the 4-port asynchronous RS-422-A adapter. This cable has a 25-pin D connector for the terminal and a 6-pin modu connector for the adapter.

ASCII Terminal Cable - RS-232-C (10 Pin) (P/N 6298186): Provides a 3-meter interface cable for attaching an ASCII terminal to any of the ports on the 4-Port Asynchronous RS-232-C adapter or the standard RS-232-C ports on the 6160 System Planar Board. This cable has a 25-pin D connector for the terminal and a 10-pin modu connector for the adapter.

ASCII Terminal Cable - RS-232-C (9-Pin) (P/N 6848245): Provides a 3-meter interface cable for attaching an ASCII terminal to the IBM Personal Computer AT Serial/Parallel Adapter. This cable has a 25-pin D connector for the terminal and a 9-pin D connector for the serial part of the Serial/Parallel Adapter.

Serial Printer Cable (9 Pin) (P/N 6298993): Provides a 3-meter cable for attaching a serial printer or plotter to the RS-232-C serial port provided on the IBM Personal Computer AT Serial/Parallel Adapter option (P/N 6450215).

IBM RT PC Small Computer System Interface Adapter Cable (P/N 79X6468): Provides a cable to connect the RT PC Small Computer System Interface Adapter option (P/N 61X7000) to the first 9332 DASD device in the string. This 8 meter cable has a 62-pin "D" connector at the host end and a 50-pin Small Computer System Interface Alternative 2 Connector at the device end. Included with the cable is a terminator to attach to the last device at the end of the string.

IBM RT PC Small Computer System Interface Device-to-Device Cable: (P/N 79X3470) Provides a one meter long cable used to connect one 9332 DASD to the next 9332 DASD in the string. The cable has a 50-pin Small Computer System Interface Alternative 2 Connector at either end.

SUPPLIES

Available from IBM.

6153 ADVANCED MONOCHROME GRAPHICS DISPLAY

PURPOSE

The 6153 Advanced Monochrome Graphic Display is a medium-resolution video monitor which provides for the display of alphanumeric and graphic output from programs running on the RT PC.

MODELS

Item 6299001 (Low Voltage)

Item 6299002 (High Voltage)

Limitations: The 6153 Advanced Monochrome Graphics Display, attached to the Advanced Monochrome Graphics Display Adapter, is a single intensity display and does not support highlighting of text or graphics. Bold or italicized characters should be used in place of highlighted characters. System software does not support blink or highlight. Applications which require these generic functions should be written or modified to change character sets or otherwise call attention to the field in question.

Maximum: One Per System.

Prerequisites: The RT PC Advanced Monochrome Graphics Display Adapter (#4765) (6294765) is required on the RT PC. The 6153 Advanced Monochrome Graphics Display is supported by the RT PC AIX Operating System.

Customer Setup (CSU): The 6153 Advanced Monochrome Graphics Display is a Customer Setup machine. Detailed setup and operational instructions are included in the "RT PC User Setup Guide", and the "RT PC Guide to Operations". The documents are included in an "Open Me First" box that is shipped with the System Unit. The customer is responsible for unpacking the 6153, attaching it to the Advanced Monochrome Graphics Display Adapter, and invoking a system diagnostic program to verify proper operation. Contact IBM.

HIGHLIGHTS

- A medium-resolution (720 X 512 pel) all-points-addressable direct-drive display designed for use with RT PC applications that require both alphanumeric and graphic output (such as text editors, drafting program, and graphical representation of business, engineering, and scientific data).
- A 253mm (10.2 in.) (diagonal raster) display with a white phosphor screen. The screen area provides for 25 rows of 80 characters, assuming an appropriate text character set. IBM provides six character sets with the RT PC which can produce from 40 to 180 characters per line and from 12 to 64 lines per screen, depending on the character set selected. By using a

graphic's editor, such as the Graphics Development Toolkit, the customer can also define his own character set or graphic symbol set within the bounds of addressability of the screen (e.g., 720 x 512 Pels). The character attributes supported include normal, bold, underline, italics, reverse video, and non-display.

- The display contains an integrated tilt and swivel mechanism, a single brightness/intensity control, and an etched anti-glare screen. The graphic display may be placed anywhere within 2.5 meters of the System Unit.
- The display is shipped with attached signal and power cables. The signal cable attaches to the display adapter located in an available I/O slot of the System Unit. The AC power cable attaches to the CEE-22 power outlet on the rear of the System Unit. The system unit on/off switch also controls power to the display.
- The 6153 Advanced Monochrome Graphics Display has the following characteristics:
 - Screen Size: (Raster) 258mm (10.2 in.) diagonal.
 - CRT: White phosphor with etched surface to reduce glare.
 - Refresh Rate: the screen is refreshed at a 46/92 HZ interlaced rate with 720 lines of horizontal resolution and 512 lines of vertical resolution. The horizontal drive frequency is 24.7KHZ.
- Dimensions:
 - Width - 327mm (12.9 in.)
 - Depth - 331mm (12.2 in.)
 - Height - 305mm (12.0 in.)
 - Weight - Approximately 8.5KG (19 lbs.)

SPECIFY

- Voltage/Line Cord/Publications Language will be supplied automatically based on Country code of the order, and specify feature codes are not normally required. Only specify the feature codes below, on an exceptional basis, when an alternative to the country default is required.
- Country default voltage is automatically supplied based on country code of order. List of countries below shows country defaults and voltage.
- High Voltage: 220V AC (180-259V), 50/60 Hz, IEC 380/435, EIF Safety Mark.
- Low Voltage: 110V AC (90-137V), 50/60 Hz, UL/CSA Safety Mark.

Country

Thailand (856)
 Bahamas (619), Barbados (621)
 Bermuda (627), Bolivia (629),
 Canada (649), Colombia (661),
 Costa Rica (663), Dominican
 Republic (681), Ecuador (683),
 El Salvador (829), Guatemala
 (731), Guyana (640), Honduras
 (735), Jamaica (759), Japan
 (760), Netherlands Antilles
 (791), Panama (811), Surinam
 (843), Taiwan (858), Trinidad
 (859), Venezuela (871),
 Argentina (613), Australia

Voltage Default

High Voltage
 Low Voltage

High Voltage

MACHINES

(616), New Zealand (796),	
Indonesia (749)	High Voltage
Hong Kong (738) Singapore	High Voltage
(834), Malaysia (778)	
Chile (655)	High Voltage
Austria (618), Belgium (624),	High Voltage
Denmark (678), Egypt (865),	
Finland (702), France (706),	
Germany (724), Greece (726),	
Portugal (822), Netherlands (788),	
Norway (806), Sweden (846),	
Spain (838), Turkey (862),	
Yugoslavia (876)	
Ireland (754), UK (866)	High Voltage
Italy (758)	High Voltage
South Africa (864)	High Voltage
Switzerland (848)	High Voltage
Israel (756)	High Voltage
Saudi Arabia (832), United	Low Voltage
Arab Emirates	

● Publications Language Group:			
Specify Code	Language		
0077	Canadian French	Norwegian	English US
0054	English US	Portugal	English US
0073	Japan	Saudi Arabia	English US
0060	Spanish	South Africa	English UK
		Spain	Spanish
		Sweden	Swedish
		Switzerland	German
		Turkey	English UK
		United Arab Emirates	English UK
		Yugoslavia	English UK

The Country Defaults for publications language are as follows:

Country	Language
Austria	German
Belgium	Dutch
Denmark	English US
Egypt	English US
Finland	English US
France	French
Germany	German
Greece	English US
Ireland	English US
Israel	English US
Italy	Italian
Netherlands	Dutch

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

6154 ADVANCED COLOR GRAPHICS DISPLAY

PURPOSE

The 6154 Advanced Color Graphics Display is a medium/resolution RGB video monitor, which provides for the color display of alphanumeric and graphic results from programs running on the IBM RT Personal Computer.

MODELS

Item 6299007, 6299008, 6299009 (Low Voltage)

Item 6299010, 6299011, 6299012, 6299013 (High Voltage)

Limitations: The 6154 Display, attached to the IBM RT PC Advanced Color Graphics Display Adapter, is capable of displaying 16 colors simultaneously from a palette of 64 colors. "Blink" is not supported by the system hardware or software. Applications which require character blink should be modified to utilize bold, italicized, or alternate foreground and background colors to call attention to the field in question. The reverse video function, found in monochrome displays, can be utilized with the color display to swap the foreground and background colors of a specified field. Intensity highlighting is not supported for the color display, however, using a contrasting color background would accomplish the same thing.

Maximum: One per system.

Prerequisites: The IBM RT PC Advanced Color Graphics Display Adapter (#4766) (6294766) is required on the IBM RT PC. The 6154 Advanced Color Graphics Display is supported by the IBM RT PC AIX Operating System.

Customer Setup (CSU): The 6154 Display is a customer setup machine. Detailed setup and operational instructions are included in the IBM RT PC User Setup Guide, and the IBM RT PC Guide to Operations. These documents are included in an "Open Me First" box that is shipped with the IBM RT PC system unit. The customer is responsible for unpacking the 6154 Display, attaching it to the IBM RT PC the Advanced Color Graphics Display Adapter, and evoking a system diagnostic program to verify proper operation.

HIGHLIGHTS

- A medium resolution (720 x 512 Pel) direct-drive RGB video monitor designed for use with IBM RT PC applications which require color output of graphic and alphanumeric data. The adapter and display are ideally suited to applications which don't require more than 16 simultaneous colors. The display subsystem (monitor and adapter) provides excellent resolution, with a reasonable number of colors, and does so without having to re-scale results prior to screen presentation. Picture Element (Pel) densities are equal in both the horizontal and vertical directions. Since the display is linear in both directions, the results of standard computations can be utilized without compensation.
- A 295mm (11.6 inch diagonal raster) display with red/green/light blue -- medium persistence phosphor. The screen area provides for 25 rows of 80 characters, assuming an appropriate text character set. IBM provides six character sets with the RT PC which can produce from 40 to 180 characters per line and from 12 to 64 lines per screen, depending on the character set selected. The customer can also define his own character set or graphic symbol set within the bounds of addressability of the screen (e.g., 720 x 512 pels). The character attributes supported include normal, bold, underline, italics, reverse foreground/background, and non-display.
- The display contains an integrated tilt and swivel mechanism, a single brightness/intensity control, and an etched anti-glare

screen. The 6154 Display may be placed anywhere within 2.5m of the IBM RT PC system unit.

- The display is shipped with an attached signal cable and a detachable AC power cable. (Note: This is for US only; all others must order power cable (line cord) separately.) The signal cable attaches to the display adapter located in an available I/O slot of the IBM RT PC system unit. The power cable attaches to both the monitor and an AC wall outlet.
- The 6154 Display has the following characteristics:
 - Screen Size: (Raster) 295mm (11.6 inches) diagonal.
 - CRT: red/green/light blue medium persistence phosphor.
 - 0.31 Shadow Mask.
 - Equal Pel density in both horizontal and vertical directions.
 - Refresh Rate: 46/92 Hz interlaced.
 - Resolution: 720 horizontal lines and 512 vertical lines.
 - Dimensions:
 - ▲ Width - 372mm (14.6 inches)
 - ▲ Depth - 400mm (15.7 inches)
 - ▲ Height - 360mm (14.2 inches)
 - Weight: Approximately 13.3kg (29.3 pounds).

Warranty Service: IBM On-Site Exchange Service is provided during the warranty period. The warranty period for the 6154 Display is 12 months. Warranty service offerings are described in the "Agreement for Purchase of IBM Machines", Z120-2892 and the "Amendment for IBM Service/Exchange Center Services", Z125-3385-01. To obtain warranty service the customer should call the NSD Service Exchange Communications Center.

Maintenance Service: Maintenance service is available under the "IBM Maintenance Agreement (MMC)", Z125-3275 and the "Amendment for IBM Service/Exchange Center Services", Z125-3385-01. The following services, as described in the "Information Bulletin For Customers - IBM Service/Exchange Center Services and Associated On-Site Services", G125-3488 are available.

- IBM On-Site Exchange (IOE)
- Customer On-Site Exchange (COE)
- Customer Carry-In Exchange (CCE)

Maintenance services under these options are available during the normal IBM business hours and no optional periods of maintenance service are offered.

Hourly Services: The repair of defective elements not covered by warranty or a maintenance agreement is only provided at the IBM repair center on an hourly service basis.

SPECIFY

- Power: See Tables 1 and 2.

Range	Feat. Code	Voltage/Power Supply
Low Voltage Range (see Table 1)	9878	90-137V AC 1-phase 50-60 Hz, UL/CSA
Low Voltage Range (see Table 1)	9880	90-137V AC 1-phase 50-60 Hz, EIF Safety Mark
High Voltage Range (see Table 2)	9879	180-259V AC 1-phase 50-60 Hz,

EIF Safety Mark

Table 1

	IBM Part Number		
	LV Group-1	LV Group-2	LV Group-3
Display P/N Specify Code	6299007 (9878)	6299008 (9878)	6299009 (9878)
Power Supply	Low Voltage Range	Low Voltage Range	Low Voltage Range
	US		
Regions Intended for Installation (typical)	Canada Bermuda	Japan Korea Taiwan Jamaica Bahamas Dominican Rep Haiti Guatemala Nicaragua Honduras Panama Costa Rica El Salvador Guyana Colombia Trinidad Barbados Venezuela Netherlands Antilles	Burma Bolivia Ecuador

Table 2

	IBM Part Number			
	HV Group-1	HV Group-2	HV Group-3	HV Group-4
Display P/N Specify Code	6299010 (9879)	6299011 (9879)	6299012 (9879)	6299013 (9879)
Power Supply	High Voltage Range	High Voltage Range	High Voltage Range	High Voltage Range
Regions Intended for Installation (typical)		Australia New Zealand	Uruguay Paraguay Sri Lanka Malaysia Singapore Indonesia Brunei Chile Argentina	Hong Kong Thailand Surinam Bangladesh Pakistan Afghanistan
	Europe Egypt Algeria Jordan Kuwait Lebanon Syria		Cameroon Sierra Leone C. Africa S. Africa	Sudan

	Israel			
	Qatar			
	Bahrain			
	Saudi Arab.			

- Line Cord: Specify 3-digit Country Code to receive appropriate line cord.

Item Number	Country
1838574	Thailand(856)
6952300	Bahamas(619)/Barbados(621)/ Bermuda(627)/Bolivia(629)/ Canada(649)/Colombia(661)/ Costa Rica(663)/Dominican Republic(681)/Ecuador(683)/ El Salvador(829)/ Guatemala(731)/Guyana(640)/ Honduras(735)/Jamaica(759)/ Japan(760)/Korea(766)/ Netherlands Antilles(791)/ Panama(811)/Surinam(843)/ Taiwan(858)/Trinidad(859)/ Venezuela(871)
6952311	Argentina(613)/ Australia(616)/ New Zealand(796)
6952320	Indonesia(749)
6952356	Hong Kong(738)/ Singapore(834)/

6952374 Malaysia(778)
Chile(655)

- Publications Language Group:

Specify Code	Language
0077	Canadian French
0054	US English
0055	Japan English
0060	Spanish

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

6155 EXTENDED MONOCHROME GRAPHICS DISPLAY

PURPOSE

The 6155 Extended Monochrome Graphics Display is a high-resolution video monitor which provides for the display of alphanumeric and graphic output from programs running on the IBM RT Personal Computer.

MODELS

Item 6299004 (Low Voltage)

Item 6299005 (High Voltage)

Limitations: The 6155 Display, attached to the IBM RT PC Extended Monochrome Graphics Display Adapter, is a single intensity display and does not support highlighting of text or graphics. Bold or italicized characters should be used in place of highlighted characters. System software does not support blink and highlight. Applications which require these generic functions should be written or modified to change character sets or otherwise call attention to the field in question.

Maximum: One per system.

Prerequisites: The IBM RT PC Extended Monochrome Graphics Display Adapter (#4768) (6294768) is required on the IBM RT PC. The 6155 Display is supported by the IBM RT PC AIX Operating System.

Customer Setup (CSU): The 6155 Display is a customer setup machine. Detailed setup and operational instructions are included in the IBM RT PC User Setup Guide and the IBM RT PC Guide to Operations. These documents are included in an "Open Me First" box that is shipped with the IBM RT PC system unit. The customer is responsible for unpacking the 6155 Display, attaching it to the IBM RT PC Extended Monochrome Graphics Display Adapter, and executing a system diagnostic program to verify proper operation.

HIGHLIGHTS

- A high resolution (1024 x 768 Pel) all-points-addressable direct-drive display designed for use with IBM RT PC applications which require both alphanumeric and graphic output (such as text editors, drafting programs, and graphical representation of business, engineering, and scientific data).
- A 335mm (13.2 in.) (diagonal raster) display with a white phosphor screen. The screen area provides for 25 rows of 80 characters, assuming an appropriate text character set. IBM provides six character sets with the IBM RT PC which can produce from 40 to 180 characters per line and from 12 or 64 lines per screen, depending on the character set selected. By using a graphics editor, such as the Graphics Development Toolkit, the customer can also define his own character set or graphic symbol set within the bounds of addressability of the screen (i.e. 1024 x 768 Pels). The character attributes supported include normal, bold, underline, italics, reverse video, and non-display.
- The display contains an integrated tilt and swivel mechanism, a brightness control, a contrast control, an on/off control, and an etched anti-glare screen. The graphic display may be placed anywhere within 2.5m of the IBM RT PC system unit.
- The display is shipped with an attached signal cable and a detachable AC power cable (US only). The signal cable attaches to the display adapter located in an available I/O slot of the IBM RT PC system unit. The power cable attaches to both the monitor and to an AC wall outlet.
- The 6155 Display has the following characteristics:

- Screen Size: (Raster) 335 mm (13.2 inches) diagonal.
- CRT: White phosphor with etched surface to reduce glare.
- Refresh Rate: The screen is refreshed at a 60 Hz progressive rate with 1024 lines of horizontal resolution and 768 lines of vertical resolution. The horizontal drive frequency is 49.1K Hz.
- Dimensions:
 - ▲ Width - 372 mm (14.7 inches)
 - ▲ Depth - 400 mm (15.8 inches)
 - ▲ Height - 360 mm (14.2 inches)
- Weight: Approximately 15.0kg (33 pounds).

Warranty Service: On-Site Exchange Service is provided during the warranty period. The warranty period for the 6155 Display is 12 months. Warranty service offerings are described in the "Agreement for Purchase of IBM Machines", Z120-2892 and the "Amendment for IBM Service/Exchange Center Services", Z125-3385-01. To obtain warranty service the Customer should call the NSD Service Exchange Communications Center.

Maintenance Service: Maintenance service is available under the "IBM Maintenance Agreement (MMC)", Z125-3275 and the "Amendment for IBM Service/Exchange Center Services", Z125-3385-01. The following services, as described in the "Information Bulletin For Customers - IBM Service/Exchange Center Services and Associated On-Site Services", G125-3488 are available.

- IBM On-Site Exchange (IOE)
- Customer On-Site Exchange (COE)
- Customer Carry-In Exchange (CCE)

Maintenance services under these options are available during the normal IBM business hours and no optional periods of maintenance service are offered.

Hourly Services: The repair of defective elements not covered by warranty or a maintenance agreement is only provided at the IBM repair center on an hourly service basis.

SPECIFY

- Power:

Item# Number	Feature Code	Voltage
6299004	9878	90-137V AC 1-phase 50-60 Hz, UL/CSA
6299004	9880	90-137V AC 1-phase 50-60 Hz, EIF Safety Mark
6299005	9879	180-259V AC 1-phase 50-60 Hz, EIF Safety Mark

- Line Cord: Specify 3-digit Country Code to receive appropriate line cord.

Item Number	Country
1838574	Thailand(856)
6952300	Bahamas(619)/Barbados(621)/ Bermuda(627)/Bolivia(629)/ Canada(649)/Colombia(661)/ Costa Rica(663)/ Dominican Republic(681)/ Ecuador(683)/ El Salvador(829)/ Guatemala(731)/Guyana(640)/

MACHINES

	Honduras(735)/Jamaica(759)/	
	Japan(760)/ Korea(766)/	0077
	Netherlands Antilles(791)/	0054
	Panama(811)/Surinam(843)/	0055
	Taiwan(858)/Trinidad(859)/	0060
	Venezuela(871)	
6952311	Argentina(613)/	
	Australia(616)/	
	New Zealand(796)	
6952320	Indonesia(749)	
6952356	Hong Kong(738)/	
	Singapore(834)/	
	Malaysia(778)	
6952374	Chile(655)	

Canadian French
US English
Japan English
Spanish

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

● Publications Language Group:

Specify
Code Language

6157 STREAMING TAPE DRIVE

PURPOSE

The 6157 Streaming Tape Drive is a 1/4 inch tape drive unit for attachment to the IBM Personal Computer, Personal Computer XT, Personal Computer AT, IBM 3270-PC, 3270 Personal Computer AT, 3270 Personal Computer XT Model 286, the IBM RT Personal Computer, and the S/36. The 6157 provides fast, convenient, save/restore and data interchange capabilities for each of the product families. Data interchange between the IBM RT PC and the S/36 is not supported.

MODELS

Model 001

Prerequisites: A separately purchased adapter card is required for attachment of the 6157 to the system unit.

System	System Unit	Feature Code
IBM RT PC	All models	#4797
S/36	5360 - all models	#7950
	5362 - all models except A01	#2908
	5364 - all models	#4156
Other IBM PCs	Personal Computer	#4156
	Personal Computer XT	
	Personal Computer AT	
	3270 PC	
	3270 PC AT	
	Personal Computer XT Model 286	

Software Considerations: IBM RT PC - See Programming Announcement Letter dated January 21, 1986.

S/36 - See Programming Announcement Letter dated January 21, 1986.

Customer Setup (CSU): The 6157 is a customer setup machine. Detailed setup and operation instructions are included with each machine. The customer is responsible for unpacking the 6157, attaching it to the system unit, and obtaining an operating system version that supports the 6157.

HIGHLIGHTS

- Operates with the appropriate Tape Adapter Card to provide a stand-alone 1/4 in. tape backup unit
- Provides up to 55Mb storage capacity (formatted) per cartridge
- 5Mb/min. burst data rate
- Permits image backup or file-by-file backup
- Formats Tape while recording data
- Read-after-Write head detects errors while recording
- Uses standard 1/4 in. tape cartridges
- Uses QIC-2 interface
- LED on front panel indicates status

The 6157 has the following characteristics:

- Up to 55Mb of storage per cartridge
- 5Mb/min. burst data rate *
- QIC-2 interface
- Shipping temperature: -40C to 60C
- Dimensions:
 - Length: 210mm (8.3 in.)
 - Depth: 369mm (14.5 in.)

- Height: 123mm (5.4 in.)
- Weight: Approximately 4.6kg (10 lbs)
- Signal cable length: 1.8m (6.0 ft)
- Operating Temperature: 10C to 40C
- Operating Relative Humidity: 20 to 80 percent
- Tape speed: 90 ips
- Recording density: 8,000 bpi

* System performance will be a function of the installed hardware and software for the using system unit.

SPECIFY

- Power:
 - #9878 (6298184) 90-137V AC, 1-phase 50 or 60 Hz, UL/CSA
 - #9879 (6299301) 180-259V AC, 1-phase 50 or 60 Hz, EIF Safety Mark
 - #9880 (6298184) 90-137V AC, 1-phase 50 or 60 Hz, IEC 435, EIF Safety Mark
- Line Cord: 3-wire, 2.8m.
 - 6952300: Bahamas, Barbados, Bermuda, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Guyana, Honduras, Jamaica, Japan, Netherlands Antilles, Philippines, South Korea, Surinam, Taiwan, Trinidad, Venezuela
 - 6952311: Australia, New Zealand
 - 6952356: Hong Kong, Malaysia, Singapore
 - 6952291: Peru
 - 6952374: Chile
- Publications Language Group:
 - #0077 Canadian French
 - #0054 UK/US English
 - #0055 Japanese
 - #0060 Spanish

SPECIAL FEATURES

6157 Streaming Tape Drive Adapter (#4160): Provides for attachment of the 6157 Streaming Tape Drive to Personal System/2 Models 50, 60, and 80 family of processors. The 6157 allows fast, convenient save/restore and interchange capabilities on 1/4-inch magnetic tape cartridges when used in conjunction with the SY-TOS/IBM Tape Utilities.

- Allows fast and convenient data save/restore
- Permits data interchange using 1/4-inch magnetic tape cartridges

Maximum: Only one adapter can be attached per Personal System/2 Models 50, 60, and 80 system. **Prerequisites:** IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 1.1 licensed program (P/N 75X1147). **Customer Setup (CSU):** Yes.

Operating Environment:

- Machine Requirements:
 - Any model of Personal System/2 Models 50, 60, and 80 and the 6157 Streaming Tape Drive.
- Programming Requirements:
 - IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 2.0 licensed program (75X1147).

IBM IBM Canada Ltd.

MACHINES

M 6157.2
AUG 87
MAJOR REVISION

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

6180 COLOR PLOTTER

PURPOSE

The 6180 Color Plotter is an 8-pen, desktop size, high resolution vector plotter capable of producing quality graphics on paper or transparency film with highly accurate registration and repeatability.

The 6180 connects via cable to the System/370, 43XX and 30XX via the 5085 Graphics Processor Unit, the 3179 mdl G or 3192 Mdl G, 3979 Model 001, the System/36 or System/38 via IBM PC using the Enhanced 5250 Emulator Version 2.1 as well as the IBM RT Personal Computer, 3270 PC Attachment, PC XT/370, IBM 3270 PC (Control Program Version 1.22 and 2.1), PC XT, PC Expansion unit, Portable PC, PC AT, PC AT/370, 3270 Personal Computer AT (Control Program Version 2.1), 3270 PC AT/G, 3270 PC AT/GX, 3270 PC/G, 3270 PC/GX or IBM Personal Computer.

Attachment is via cable purchased from IBM as an Accessory.

MODELS

Model 1: Attachment capability which conforms to electrical interface specifications EIA RS-232-C and CCITT V24.

Model 2: Attachment capability which conforms to electrical interface specification IEEE488-1978.

Customer Setup (CSU): The IBM 6180 is designated as a CSU product.

HIGHLIGHTS

- Provides ability to plot A/A4 size drawings (8.5 x 11 in. / 210 x 297mm).
- Eight Pens mounted in a carousel
- Two pen types
 - Fiber Tip for paper
 - ▲ Line Widths - 0.3 or 0.7mm
 - ▲ Colors - Black, Red, Green, Blue, Burnt Orange, Lime Green, Gold, Turquoise, Violet, or Brown.
 - Fiber Tip for transparency film
 - ▲ Line Widths - 0.3 or 0.6 mm
 - ▲ Colors - Black, Red, Green, Blue, Orange, Brown or Violet.
- Pens are automatically capped when in the carousel to retard ink drying problems and increase the life of the pens.
- Paper or transparency film can be selected as the drawing media as application requires.
- Precise media control yields excellent line quality.
- Simple and convenient pushbutton control is designed into the plotter.
- The Graphics Enhancement Cartridge (GEC)(#5010) significantly expands the 6180's graphics capabilities. The plotter's buffer space is increased from 60 to 1024 bytes (it can be further extended to 1974 bytes thru programming). The number of character sets is also increased from five to nineteen. The GEC adds fourteen additional ROM-based plotter commands, including three new polygon commands that simplify filling and edging of shapes (ie. bars, pie wedges, circles). Use of the new commands will require program additions. When equipped with the GEC, the 6180 becomes fully compatible with the IBM 7372 and HP 7475A. The GEC is available by FC

when ordered with the plotter or P/N when ordered from NDD Direct.

- Pen Speed, maximum
 - Pen down 40.0cm/sec (16.0 in/sec)
 - Pen up 50.8cm/sec (20.0 in/sec)
- Acceleration approximately 1.25 g/s
- Resolution 0.025mm (0.001 in)
- Repeatability
 - With a given pen 0.1mm (0.004 in)
 - From Pen to Pen 0.2mm (0.008 in)
- The 6180 attaches to a variety of systems. Attachment is via cable to either a EIA standard RS-232-C or IEEE-488 standard interface port. Variations in connectors are determined by Specify Codes. (Remote attach is not supported.)

Prerequisite Operating Environment

Programming Support: The 6180 Color Plotter can be controlled by any host computer system that provides programming to generate ASCII coded IBM Graphic Language (IBM GL) commands. Refer to the appropriate host hardware and graphics software documentation for interface availability.

- IBM Personal Computer (asynchronous adapter/Mdl 1 Plotter)
 - IBM SlideWrite (P/N 6317034, 5875-EEE, #7034)
 - IBM Graphing Assistant (P/N 6024147, 5875-EEE, #4147)
 - IBM Personal Decision Series, Graphs Edition (P/N 6410938, 5875-EEE, #9368). Note: The Data Edition is a prerequisite.
 - IBM PC Graphics Development Toolkit (P/N 6024196, 5875-EEE, #4196). Note: 6180 is supported as a 7372 (Requires, #5510).
 - IBM PC Plotting System (P/N 6024204, 5875-EEE, #4204)
 - PC Picture Graphics (P/N 6276508)
 - BPS Business Graphics (P/N 6871470, 5875-EEE, #9280)
 - Chart-Master (P/N 6871432, 5875-EEE, #9242)
 - Energraphics Plotter (P/N 6187236, 5875-EEE, #9497). Note: Energraphics is a prerequisite
 - Fast Graphs (P/N 6871362, 5875-EEE, #9118)
 - Framework (P/N 6187185, 5875-EEE, #9446)
 - Gem Draw (P/N 6205272)
 - Graphwriter: Basic Set (P/N 6871476, 5875-EEE, #9286), Combination Set (P/N 6871477, 5875-EEE, #9287), Extension Set (P/N 6871478, 5875-EEE, #9288)
 - Sign-Master (P/N 6187183, 5875-EEE, #9444)
 - SuperCalc3 (P/N 6871375, 5875-EEE, #9129)
 - Symphony (P/N 6187187, 5875-EEE, #9448)
 - 1-2-3 (P/N 6871325, 5875-EEE, #9047)
- IBM 3270 PC/G, GX (IEEE adapter/Model 2 Plotter)
 - IBM 3270-PC Color Graphics Applications (P/N 4421760, 5875-EEE, #1508)
 - GDDM Release 4 (host program, 5748-XXH) Note: 6180 is supported as a 7372 using A/A4 size paper (using 6 pens).

- IBM PC (GPIB adapter/Model 2 Plotter)
 - General Purpose Interface Bus Programming Support (P/N 6024201)
- IBM 5085 Graphics Processor (with feature #5510/Model 1 Plotter) (Plotter requires #5010 Graphics Enhancement Cartridge)
 - Industry Standard Plotting Commands (5796-BDZ), allows output from CAD/CAM applications such as: CADAM, CBDS, CAEDS, and CATIA
 - Graphical Display and Query Facility (5668-905)
- Host connected PC based applications (asynchronous adapter/ Model 1 plotter)
 - IBM Color Plotter Support for the GDDM Graphics Data File (5668-860)
 - Industry Standard Plotting Commands (5796-BDZ)
 - Interactive Presentation Graphics (5798-DJT)
- 3179 Mdl G or 3192 Mdl G via 3979 Model 001 (Model 2 Plotter)
 - GDDM Release 4 (5748-XXH) Note: 6180 is supported as a 7372 using A/A4 size paper (using 6 pens).
- The System/36 Business Graphics Utilities/36 will support the 6180 Color Plotter Model 1, configured as a 7371 attached to the PC using the Enhanced 5250 Emulator Version 2.1. System/38 GDDM PGR, and Business Graphics Utility also support the 6180 Color Plotter Model 1 configured as a 7371 or 7372. Both System/36 and System/38 support 6 pens.
- Native Mode Release 1 Applications Software (Model 1 Plotter)
 - PC Co-Processor applications
 - ▲ IBM SlideWrite (P/N 6317034, 5875-EEE, #7034)
 - ▲ IBM Personal Decision Series, Graphs Edition (P/N 6410938, 5875-EEE, #9368). Note: The Data Edition is a prerequisite
 - ▲ IBM PC Graphics Development Toolkit (P/N 6024196, 5875-EEE, #4196)
 - ▲ 1-2-3 (P/N 6871325, 5875-EEE, #9047)
 - RT Personal Computer Applications
 - ▲ RS/1 (P/N 6317046, #7046)
 - ▲ UNIRAS
 - ▲ RT Personal Computer Graphics Development Toolkit (P/N 55X8921)

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Information contained herein concerning non-IBM software is based on information obtained from individual vendors. IBM has not evaluated these offerings and makes no judgments with regard to their function, quality, or performance. There may be other vendors offering similar products who are not listed. The fact that a product is or is not listed should not be taken as an IBM endorsement, or lack of endorsement, of the product.

Physical Specifications: Machine/Cartron Dimensions

Width: 460.0mm (18.4 in.) 24 inches
 Depth: 308.0mm (12.3 in.) 18.75 inches
 Height: 124.0mm (5.0 in.) 15.5 inches
 Weight:
 Net 5.5 Kg (12.0 lbs.)
 Shipping 11.34 Kg (Approx 25.0 lbs)

Operating Environment:

Temperature - 50F to 105F (10C to 40.6C)
 Relative Humidity - 8% to 80%
 Max Wet Bulb - 80F (26.7C)

Non-operating Environment:

Temperature - 50F to 125F (10C to 51.7C)
 Relative Humidity - 8% to 80%
 Max Wet Bulb - 80F (26.7C)

Shipping:

Temperature - -40F to 140F (-40C to 60C)
 Relative Humidity - 5% to 100%
 Max Wet Bulb - 33F to 85F (.6C to 29.4C) (No Condensation)

Operating Altitude: 2135m (0 to 7000 ft)

Interface Cables: Available as Accessories. When ordering plotters one interface cable for each plotter purchased may be ordered using the feature codes listed below. Additional cables if required may be ordered by part number from ISSD.

#5020 (P/N 5452377) - For IBM 5085
 #5040 (P/N 5452378) - For IEEE-488 Interface

Note: The IEEE-488 adapter on the 3270-PC/G and 3270-PC/GX includes a cable for the plotter attachment. (Cable purchase is not required if plotter is the only device to be attached.) Additional devices may be attached to the same adapter. (One cable feature # 5040 is required for each additional device.)

#5050 (P/N 5458877) RS-232-C cable for all 6180 to PC attachments

Note: The IBM PC AT and 3270 Personal Computer AT require Serial Adapter Cable when attaching plotters. (P/N 6450242, IBM PC AT and 3270 Personal Computer AT feature # 0242)

The RT Personal Computer requires a Serial Printer Cable (10 pin) when attaching plotters. (P/N 6294803, RT-PC feature #4803.)

Publications: One publication will be shipped with this plotter: IBM 6180 Color Plotter Guide to Operations (GTO). Note: This manual is available in English, German, and Japanese. World Trade customers will get either a English or a selected language version (when available) of the GTO. 6180 Color Plotter Programming. Note: This manual is available in English only.

Education: No formal education is planned.

SPECIFY

- Power:
 - 100V AC, 1-Phase, 3 wire, 48-60Hz, 20 Watts Maximum
 - 120V AC, 1-Phase, 3 wire, 48-60Hz, 20 Watts maximum
 - 220V AC, 1-Phase, 3 wire, 48-60Hz, 20 Watts maximum
 - 240V AC, 1-Phase, 3 wire, 48-60Hz, 20 Watts maximum

One power supply line cord is supplied with each machine.

Languages: Specify Codes will be used to determine documentation language shipped.

Documentation is available in English, German, and Japanese. One English or one translated (if specified) Guide to Operations will be supplied with each plotter. (Programming Manuals will be available in English only.)

One power supply/line cord will be supplied with each machine. Supply voltage must be specified using codes indicated in table below. The Guide to Operations (GTO) code is also indicated.

Countries	Power 48-66 Hz	Languages (GTO)
Argentina #9520	220V	Eng
Australia #9515	240V	Eng
Brazil #9911	120V	Eng
Canada #9911	120V	Eng
Hong Kong #2813*	220V	Eng
Indonesia #2813*	220V	Eng
Japan #2730	100V	Japanese
Korea #2730	100V	Eng
Malaysia #2801	240V	Eng
Mexico #9911	120V	Eng
New Zld #9515	240V	Eng
Singapore #2801	240V	Eng
Taiwan #9911	120V	Eng
Venezuela #9911	120V	Eng

Note: Homologation requirements will be met where required by countries included in the above table.

Countries not listed above will be handled on an exception basis and will be limited to available power supplies, plugs and document translations. The plotters will not have been homologated or tested for use in countries other than those listed.

A country Safety Organization (i.e UL/CSL equivalent) approved adapter plug will have to be obtained locally to allow conversion of the wall plug in those countries where the specify code is marked with an asterisk (*).

SPECIAL FEATURES

The Graphics Enhancement Cartridge (GEC) (#5010): The GEC significantly expands the 6180's graphics capabilities. The plotter's buffer space is increased from 60 to 1024 bytes (it can be further extended to 1974 bytes thru programming). The number of charac-

ter sets is also increased from five to nineteen. The GEC adds fourteen additional ROM-based plotter commands - including three new polygon commands that simplify filling and edging of shapes (ie. bars, pie wedges, circles). Use of the new commands will require program additions. When equipped with the GEC the 6180 becomes fully compatible with the IBM 7372 and HP 7475A. The GEC is available by FC when ordered with the plotter or P/N when ordered from NDD Direct.

Supplies Kit (#5070): The Supplies Kit consisting of 16 overhead transparency pens and 100 sheets of transparency film is offered for delivery with the plotter to provide users with an initial stock of supplies for presentation graphics output. It is only available with "A-size" media.

This Supplies Kit, which may be ordered only once (1) per plotter, is available only at initial order time.

All the items in the Supplies Kit are available individually from IBM Direct, (1-800-IBM-2468).

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

A starter kit of commonly used supplies is provided with each plotter to enable the user to use the 6180 upon receipt. Included are pens for plotting on paper and plotting paper.

The 6180 utilizes all the existing supplies for the IBM 7371.

The following are new supplies which are included as part of this announcement and are applicable as noted to users of the 7371 and 7372 as well as the 6180.

- Overhead Transparency Kit, P/N 5452382 - (7371 and 6180 only).
- A - Size Quality Presentation Paper, P/N 5457803 - (All IBM Plotters).
- A4-Size Quality Presentation Paper, P/N 5457804 - (All IBM Plotters).

Supplies and Cables are available from Information Systems and Supplies Division (ISSD).

6182 AUTO FEED COLOR PLOTTER**PURPOSE**

The new 6182 Auto Feed Color Plotter is a high performance, high quality, eight-pen desktop plotter that produces A and B size drawings, charts and graphs on paper, transparencies, and drafting media. The integrated sheet feed capability of the 6182 makes it ideal for unattended plotting or preparation of multiple sets of color charts.

The Guide to Operations will be available in English, German and Spanish. To allow earlier shipment to World Trade Corporation, all machines shipped will have one copy of the English version of the Guide to Operations. When the translated manuals become available either an English or the specified translated manual will be shipped with the plotter to the customer.

The Hardware Maintenance Service and Programming manuals are available in English only.

Note: Unlike other color plotters, the 6182 contains some machine readable information (MRI) displayed in English-only on an LCD panel. International ICONS are used for front panel buttons.

MODELS**Model 1 001**

Prerequisites: To operate the plotter a system unit and interface cable will be required. Also, for B/A3 size media operation, a B/A3 size media handling kit is required.

Customer Setup (CSU): This plotter is designated CSU.

HIGHLIGHTS

- IBM's fastest desktop plotter.
- Plots on A or B sized paper, transparency, vellum, or polyester film.
- Automatic Sheet Feed for paper or transparency.
- Eight-Pen Carousel for automatic pen changing and pen capping.
- Two fonts are available. A proportional font provides maximum readability and a "stick" font with fixed spacing for speed.
- 1024 Byte I/O buffer, user configurable up to 12K, to facilitate efficient data transfer.
- Both RS-232-C and IEEE488 interfaces are standard.
- LCD Display guides operator through set-up. No rear panel switches.
- Twenty character sets are standard for international usage.
- The Guide to Operations will be available in English, German, and Spanish.

To allow earlier shipment to World Trade Corporation all machines shipped will have one copy of the English version of the Guide to Operations. When the translated manuals become available either an English or the specified translated manual will be shipped with the plotter to the customer.

The Hardware Maintenance Service and Programming manuals are available in English only.

Unlike other plotters, the 6182 contains some machine readable information (MRI) in English-only on an LCD Panel. International ICONS are used for front panel buttons to assist operators.

Physical Specifications:

Width: 670mm (26.4 inches)
Depth: 432mm (17.0 inches)
Height: 215mm (8.5 inches)
Weight: 17.3kg (38.5 pounds) net

Operating Environment:

Temperature: 10 to 40.0 degrees C
Relative Humidity: 8 to 80 percent

With sheet feed 10 to 40.0 degrees C; 20-80 percent relative humidity

With film 15 to 35.0 degrees C; 25-75 percent relative humidity

Publications:

The following publications are shipped with the product.

- SA37-0100 IBM 6182 Guide to Operations
- SA37-1010 IBM 6182 Hardware Maintenance and Service

The following publications will be available from EPC when translation is available:

- IBM 6182 Guide to Operations (FC #2929) German
- IBM 6182 Guide to Operations (FC #2931) Spanish

DESCRIPTION

The IBM 6182 Auto Feed Color Plotter is a desktop workstation plotter that provides high quality output for the office environment. Compatibility with the industry standard HP-GL command set ensures wide software support and consistency with currently installed plotters.

The 6182 provides high quality plots appreciably faster than other desktop plotters. The 6182's high resolution produces smooth arcs and draws lines that meet precisely. It has a curved line generator which can be invoked when exceptionally smooth curves are required.

The IBM 6182 minimizes manual handling of paper and transparency film. It features an automatic sheet feed with a capacity of 150 paper sheets or 100 overhead transparencies. This allows unattended plotting or use of the IBM 6182 in shared resource environments.

Key Product Characteristics Include:

- Maximum Pen Speed - 80cm/sec (31.5 in/sec)
- Acceleration - 6 g
- Resolution - Addressable resolution: 0.025mm (0.001 in) - Mechanical Resolution: 0.006mm (0.00025 in)
- Repeatability - For a given pen : 0.1mm (0.004 in)
- Drawing Sizes - A (8 1/2 X 11 inch) or A4 (210 X 297mm) - B (11 X 17 inch) or A3 (297 X 420mm)
- Pen Types - fiber-tip, rollerball, refillable drafting, and disposable drafting
- Media Types:
 - Plotter paper
 - Glossy presentation paper
 - Transparency film
 - Vellum
 - Double-matte polyester film

- Interface - Both RS-232-C and IEEE-488 interfaces are standard
- I/O Buffer Size - 1024 bytes, reconfigurable up to 12 Kbytes

The 6182 is simple and convenient to operate. Most plotter functions are controlled by the user's graphics software package. Therefore, professional looking high quality graphs and drawings can be produced even by casual users.

The Guide to Operations manual will be available in English, German, and Spanish.

To allow earlier shipment to World Trade Corporation all machines shipped will have one copy of the English version of the Guide to Operations. When the translated manuals become available either an English or the specified translated manual will be shipped with the plotter to the customer.

The Hardware Maintenance Service and Programming manuals are available in English only.

Note: Homologation requirements will be met where required by countries included in the above table.

Countries not listed above will be handled on an exception basis and will be limited to available power supplies, plugs and document translations. The plotters will not have been homologated or tested for use in countries other than those listed.

SPECIAL FEATURES

6182/5085 RS-232-C Cable (#5020)

RT PC Cable Adapter (#5030)

IEEE Cable (#5040)

MODEL CONVERSIONS (NONE)

SPECIFY

These specify features are available only at time of manufacture.

Power:

- 100V AC 1-Phase, 3 wire, 48-60 Hz
- 120V AC 1-Phase, 3 wire, 48-60 Hz
- 220V AC 1-Phase, 3 wire, 48-60 Hz
- 240V AC 1-Phase, 3 wire, 48-60 Hz
- One power supply line cord is supplied with each plotter

The country standard Voltage/Power Cord, Nomenclature/Language will automatically be supplied based on the country code of the order, except Africa/Middle East. The Specify codes below are only to be ordered when an alternative to the country default is required.

Spec/	POWER	Spec/	LANGUAGES
ify	ify	ify	
Spec/	POWER	Spec/	LANGUAGES
ify	ify	ify	
48-66 Hz	Guide to Operations		
Argentina	#9520 220V	#2931	Spanish
Australia	#9515 240V		English
Brazil	#9911 120V		English
Canada	#9911 120V		English
Hong Kong	#2813 220V		English
Indonesia	#2813 220V		English
Japan	#2730 100V		English
Korea	#2730 100V		English
Malasia	#2801 240V		English
Mexico	#9911 120V	#2931	English
New Zealand	#9515 240V		English
Singapore	# 2801 240V		English
Taiwan	# 9911 120V		English
Venezuela	# 9911 120V	#2931	Spanish

ACCESSORIES

Accessory Name(s) and Part Numbers: RT PC

- RT PC Cable Adapter, P/N 5470273
- RS-232 Cable (For 5085 Attachment), P/N 5470476
- IEEE-4888 Cable, P/N 5452378
- B Size Media Handling Kit, P/N 5470298
- A/3 Size Media Handling Kit, P/N 5470477
- A Size Polyester Film (50 sheets), P/N 5470274
- B Size Polyester Film (50 sheets), P/N 5470287
- A Size Vellum (150 sheets), P/N 5470288
- B Size Vellum (150 sheets), P/N 5470289
- A Size Media Loading Tray, P/N 5470433
- A/4 Media Loading Tray, P/N 5460434
- Fiber-Tip Transparency Carousel, P/N 5470299
- Fiber-Tip Paper Carousel, P/N 5470303
- Roller-Ball Carousel, P/N 5470304
- Drafting Carousel, P/N 5470306

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

6184 COLOR PLOTTER**PURPOSE**

The IBM 6184 Color Plotter is an economical, multi-pen drafting plotter that produces large format, C/A2 and D/A1 size, engineering drawings. It is an ideal peripheral for IBM's entry level workstations, representing a new price point for high quality plotters. This new plotter is supported by Professional CADAM running on the IBM RT Personal Computer along with IBM's CAD/CAM applications and various third party offerings running on the IBM PC family.

MODELS

Model 1 001

Customer Setup (CSU): Yes.

ATTACHMENTS

- RS-232-C (model 1) - Attachment capability that conforms to electrical interface specifications EIA RS-232-C and CCITT V.24.
- IEEE488 (model 1 with feature code #5050 or #5060) - Attachment capability that conforms to electrical interface specifications IEEE488-1978.

This plotter has been tested in the following IBM system configurations using the RS-232-C and/or IEEE488-1978 interfaces and the interface cables listed as accessories in this release:

- Plotter attached, using RS-232-C interface, to an IBM RT Personal Computer via the:
 - 2-port native RS-232-C adapter
 - 4-port asynchronous RS-232-C adapter
 - 5085 Graphics Processor attached to the RT Personal Computer via the 5085 attachment feature of the RT PC.
- Plotter attached, using RS-232-C interface, to an IBM Personal Computer (including PC, PC-XT, PC-XT/model 286, PC-AT, 3270-PC (Control Program 1.22, 2.1, 3.0), 3270 Personal Computer AT (Control Program 3.0), PC XT/370 and PC AT/370)
- Plotter attached, using RS-232-C interface, to the following terminal (equipped with the applicable prerequisites), attached to a System/370, 30XX, 43XX or 93XX processor via:
 - IBM 5080 Graphics System with #5510 RS-232-C feature
- Plotter attached, using IEEE488 interface, to any of the following terminals (equipped with the applicable prerequisites), attached to a System/370, 30XX, 43XX or 93XX processor via:
 - IBM 3179 G1, G2 Display with #3979 Expansion Unit
 - IBM 3270 PC/G, /GX, AT/G and AT/GX
- Plotter attached, using IEEE488 interface, to an IBM Personal Computer with the GPIB interface card (PC, PC-XT and PC-AT)

HIGHLIGHTS

- 8-pen carousel that allows for automatic pen changing and pen capping.
- High line quality provides smooth circles, consistent line widths, and crisp characters.
- Switchable pen sorting feature provides decreased plot time with applications where excessive pen switching occurs.
- 7,448-byte data buffer provides efficient data transfer.
- Uses standard IBM fiber tip and IBM drafting plotter pens.

- Software support by IBM's line of CAD/CAM applications including: CADAM (TM), CATIA (TM), CBDS, CAEDS, CIEDS, GPG (GFIS), GDQF, graphIGS (TM) and CADwrite.

DESCRIPTION

The IBM 6184 Color Plotter is a low-cost engineering workstation drafting plotter that provides high quality output for the Computer Aided Design (CAD) marketplace. Compatibility with the industry standard HP-GL command set ensures wide software support and consistency with currently installed plotters.

The 6184 was designed to provide superior line quality and plot resolution. Its plotting mechanism incorporates high-performance, digitally controlled servo-motors mounted in a precision chassis. This design reduces the number of parts required and results in a more economical plotter with increased reliability.

Media loading has been made simple by using a single lever to raise and lower the pinch wheels. The single lever also raises and lowers two paper alignment guides on the left side of the platen. The right pinch wheel is also movable to accommodate paper sizes.

Key product characteristics include:

- Compact, free-standing design
- Maximum Pen Speed:
 - Pen down - 42.0cm/sec. (16.5 in./sec.)
 - Pen up - 50.8cm/sec. (20.0 in./sec.)
- Acceleration - 2 g's
- Resolution:
 - Addressable - 0.025mm (0.001 in.)
 - Mechanical - 0.013mm (0.0005 in.)
- Repeatability:
 - With a given pen - 0.1mm (0.004 in.)
 - from pen to pen - 0.2mm (0.008 in.)
- Accuracy:
 - 0.2% of specified line length, or
 - 0.5mm (0.02 in.), whichever is greater
- Drawing sizes:
 - C (17 X 22 inch) or A2 (420 X 594mm)
 - D (22 X 34 inch) or A1 (594 X 841mm)
- Two Pen Types:
 - Fiber-tip pens
 - Drafting pens
- Three Media Types:
 - Chart paper
 - Vellum
 - Double-matte polyester film
- Either RS-232-C (Model 1) or IEEE488 (via feature #5050 or #5060) interconnection capabilities.
- Utilizes the basic IBM 7374 command set. In many cases, drivers for the IBM 7374 or Hewlett-Packard's 7570A or 7580B will support the IBM 6184 plotter.

The 6184 is simple and convenient to operate. Most plotter functions are controlled from the user's graphics software package. Therefore, professional looking, high-quality engineering drawings can be produced even by casual users.

Physical Specifications:

Width - 1,140mm (44.9 inches)
Depth - 520mm (20.5 inches)
Height - 1,033mm (40.6 inches)
Weight - Net: 30kg (66 pounds)
- Shipping: 64kg (140 pounds)

Operating Environment:

- Operating:
 - Temperature - 0 to 55 degrees C (-32 to 131 degrees F)
 - Relative Humidity - 5 to 95 percent
 - Max Wet Bulb - 26.7 degrees C (80 degrees F)
- Non-Operating:
 - Temperature - -40 to 75 degrees C (-40 to 167 degrees F)
 - Relative Humidity - 5 to 95 percent
 - Max Wet Bulb - 26.7 degrees C (80 degrees F)
- Shipping:
 - Temperature - -40 to 60 degrees C (-40 to 140 degrees F)
 - Relative Humidity - 5 to 100 percent
 - Max Wet Bulb - 0.6 to 29.4 degrees C (33 to 85 degrees F) (No Condensation)
- Operating Altitude - 0 to 2,135m (0 to 7,000 ft)

Programming Support: The 6184 can be controlled by any computer system that provides programming to generate ASCII coded Graphic Language (GL) commands. Refer to the appropriate hardware and graphics software documentation for required hardware configuration, supported DOS levels, and interface availability.

The following hardware/software environments have been tested with the 6184:

- IBM RT Personal Computer
 - Professional CADAM
 - Personal graPHIGS
 - CIEDS/Design Capture for IBM RT PC
 - CAEDS for IBM RT Personal Computer
 - RS/1
 - UNIRAS
- IBM 5080 Graphics System (with 5085 feature #5510) supported by the following IBM System/370, 30XX, 43XX, 93XX products:
 - IBM Industry Standard Plotting Commands (ISPC)
 - CADAM, CATIA, CAEDS, CBDS, CIEDS, GPG via ISPC
 - IBM Color Plotter Support for GDDM/GDF (CPS)
 - GDDM/graPHIGS via CPS
 - Graphical Display and Query Facility (GDQF)
- 3179G1 and G2 via 3979 (with IEEE488 Cartridge) supported by the following IBM System/370, 30XX, 43XX, 93XX products:
 - GDDM release 1.4
 - GDDM/graPHIGS via GDDM
- IBM 3270 PC/G and 3270 PC/GX (with IEEE488 Cartridge) supported by the following IBM System/370, 30XX, 43XX, 93XX products:
 - GDDM release 2.1
 - GDDM/graPHIGS via GDDM
- IBM Personal Computer family:
 - CIEDS/Design Capture for IBM PC-AT
 - CADwrite
 - IBM SlideWrite
 - ANVIL-1000
 - AutoCAD
 - CADKEY

- Design Board 3D
- RoboCAD PC
- VersaCAD Advanced
- IBM 3270 PC/G and 3270 PC/GX (with IEEE488 Cartridge):
 - IBM 3270 PC Color Graphics Applications
- IBM PC (GPIB adapter, IEEE488 Cartridge):
 - General Purpose Interface Bus Programming Support

CADAM is a registered trademark of CADAM, INC.
CATIA is a registered trademark of Dassault Systemes.
CBDS is a trademark of Bell Northern Research (Canada)
CAEDS is a registered trademark of IBM Corp.
CIEDS, graPHIGS, and CADwrite are trademarks of IBM
UNIRAS is a trademark of UNIRAS Incorporated.
RS/1 is a trademark of Bolt, Beranek and Newman Inc.
ANVIL is a trademark of Manufacturing Consulting Services
AutoCAD is a trademark of Autodesk, Inc.
CADKEY is a trademark of Micro Control Systems, Inc.
Design Board 3D is a trademark of MegaCADD, Inc.
Robo CAD PC is a trademark of Robo Systems Corp.
VersaCAD is a trademark of T & W Systems, Inc.

Information concerning non-IBM software is based on information obtained from individual vendors. IBM has not evaluated these offerings and makes no judgments with regard to their function, quality, or performance. There may be other vendors offering similar products who are not listed. The fact that a product is or is not listed should not be taken as an IBM endorsement, or lack of endorsement, of the product.

Publications

- Two publications will be shipped with this plotter:
 - IBM 6184 Color Plotter Guide to Operations (GTO)
 - IBM 6184 Color Plotter Hardware Maintenance Service (HMS)
- An additional manual will be available as a feature for the IBM 6184:
 - IBM 6184 Color Plotter Programming

Note: The GTO manual is available in English, German and Spanish. World Trade customers will receive both an English or a suitable language version (when available) of the GTO.

The HMS and Programming manuals will be available in English only.

SPECIFY

- Power (AC, 1-Phase, 3 wire, 48-66Hz, 20 Watts maximum). One cord is supplied with each machine.

Argentina	#9520	220V
Australia	#9515	240V
Brazil	#9911	120V
Canada	#9911	120V
Hong Kong	#2813*	220V
Indonesia	#2813*	220V
Japan	#2730	100V
Korea	#2730	100V
Malaysia	#2801	240V
Mexico	#9911	120V
New Zealand	#9515	240V
Singapore	#2801	240V
Taiwan	#9911	120V
Venezuela	#9911	120V

Note: Homologation requirements will be met where required by countries included in the above table.

Countries not listed above will be handled on an exception basis and will be limited to available power supplies, plugs,

and document translations. The plotters will not have been homologated or tested for use in countries other than those listed.

A country Safety Organization (i.e. UL/CSA equivalent) approved adapter plug will have to be obtained locally to allow conversion of the wall plug in those countries where the specify code is marked with an asterisk (*).

- Languages: Specify Codes will be used to determine documentation language shipped.

Documentation is available in English, German and Spanish. One English or one translated (if specified) Guide to Operations will be supplied with each plotter. (Programming and Maintenance manuals will be available in English only).

- Venezuela #2931 Guide to Operations (Spanish)
- Mexico #2931 Guide to Operations (Spanish)
- Argentina #2931 Guide to Operations (Spanish)

- Interface Cables: See "Accessories"

- Cartridge Options (can only be purchased with initial order):

- #5050 (P/N 5472347) GPIB (IEEE488) Cartridge
- #5060 (P/N 5470207) GPIB (IEEE488)/Kanji Cartridge

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

When ordering plotters, one interface cable for each plotter purchased may be ordered using the feature codes listed below. Additional cables if required may be ordered by part number from ISSD.

- #5020 (P/N 5452377) For IBM 5085
- #5030 (P/N 5458877) RS-232-C cable for all 6184 to PC attachments (1)
- #5040 (P/N 5452378) For IEEE 488 Interface (2)

Notes:

1. The IBM PC AT and 3270 Personal Computer AT require Serial Adapter Cable when attaching plotters (P/N 6450242, IBM PC AT and 3270 Personal Computer AT feature # 0242). The IBM RT Personal Computer requires a Serial Printer Cable (10 pin)

when attaching plotters (P/N 6294803, RT PC Feature #4803). With the RT PC, plotter FC #5030 is not required.

2. The IEEE488 adapter on the 3270 PC/G and /GX includes a cable for the plotter attachment. (Cable purchase is not required if the plotter is the only device to be attached). Additional devices may be attached to the same adapter. (One cable feature #5040 is required for each device). The IEEE488 cable is required for plotter attachment to the 3270 PC-AT/G and PC-AT/GX.

SUPPLIES

A starter kit of commonly-used supplies is provided with each plotter to enable the user to use the 6184 upon receipt. Included are pens and plotting paper.

The 6184 utilizes existing supplies for the IBM 7374:

- D-Size Media:
 - Ledger Bond, Vellum and Polyester film
- Pen Types:
 - Fiber tip for Ledger Bond (2 widths, 10 colors)
 - Drafting for Vellum or Polyester film (3 widths)

The following new supplies are applicable to users of the 7374 and 7375, as well as the 6184:

- C- Size Ledger Bond (5470302)
- C- Size Vellum (5470305)
- C- Size Polyester film (5470308)
- Disposable Liquid Ink Drafting Pens:
 - Black (0.3 mm) (5472363)
 - Blue (0.3 mm) (5472364)
 - Green (0.3 mm) (5472365)
 - Red (0.3 mm) (5472366)
 - Black (0.6 mm) (5472367)
 - Blue (0.6 mm) (5472368)
 - Green (0.6 mm) (5472369)
 - Red (0.6 mm) (5472370)
 - Multi-color (0.3 mm) (5472371)
 - Multi-color (0.6 mm) (5472372)
 - Adapter and Pen Cap Assemblies (5472373)

The following supplies operate only with the 6184:

- Carousel, Fiber-tip Pen (5458894)
- Carousel, Drafting Pen (5458895)
- Replacement Boots, Fiber-tip Pen (5470300)
- Replacement Boots, Drafting Pen (5470301)

Supplies and Cables are available from Information Systems and Supplies Division (ISSD). Information System Supplies (ISS).

6186 COLOR PLOTTER

PURPOSE

The 6186 Color Plotter is a high performance, multi-pen drafting plotter that produces A thru E (A4-A0) size engineering drawings. Two models are offered. They provide increased throughput and higher line quality at a significantly lower price. The 6186 is software compatible with IBM's 7374/7375 line of plotters which it replaces.

MODELS

Model 1: Plots on cut sheet media similar to the IBM 7374 and IBM 7375-1.

Model 2: Utilizes both cut sheet and continuous roll media. The continuous roll capability permits plotting multiple drawings without reloading media for each plot, similar to the IBM 7375-2.

Customer Setup (CSU): The 6186 is designated as a CSU product.

HIGHLIGHTS

- Eight-pen carousel that allows for automatic pen changing and pen capping.
 - High line quality provides smooth circles, consistent line widths and crisp characters.
 - Selectable pen sorting feature can decrease plot time with applications where extensive pen switching occurs.
 - 26KB data buffer provides efficient data transfer.
 - Uses standard IBM fiber-tip, roller-ball and drafting plotter pens.
 - Selectable IBM 7375 Emulation mode, insures software compatibility
 - Software support by IBM's line of CAD/CAM applications including: CADAM(1), CATIA(2), CBDS(3), CAEDS(4), CIEDS, GPG, GDQF, graPHIGS(5) and CADwrite(5).
- 1 - Registered Trademark of CADAM INC.
 2 - Registered Trademark of Dassault Systems.
 3 - Trademark of Bell Northern Research.
 4 - Registered trademark of IBM Corp.
 5 - Trademark of IBM Corp.

DESCRIPTION

The 6186 Color Plotter is a low-cost engineering workstation drafting plotter that provides high quality output for the Computer Aided Design (CAD) market-place. It provides extensive software support and consistency with currently installed plotters with the widely used HP-GL command set.

The 6186 was designed to provide superior line quality and plot resolution. Its plotting mechanism incorporates high-performance, digitally controlled servo-motors mounted in a precision chassis. This design reduces the number of parts required and results in a more economical plotter with increased reliability.

Media loading has been made simple by using a single lever to raise and lower the pinch wheels. The single lever also raises and lowers two paper alignment guides on the left side of the platen. The right pinch wheel is also movable to accommodate paper sizes.

Key product characteristics include:

- Maximum Pen Speed: 60.0 cm/sec (24.0 in/sec)

- Acceleration: 5.7g
- Resolution: addressable 0.025mm (0.00098 in.)
- Repeatability: for a given pen 0.10mm (0.004 in.)
- Accuracy:
 - 0.1% of the move
 - or 0.25mm (0.0098 in.), whichever is greater
- Drawing sizes:
 - A (8-1/2 X 11 in.) or A4 (210 X 297mm)
 - B (11 X 17 in.) or A3 (297 X 420mm)
 - C (17 X 22 in.) or A2 (420 X 594mm)
 - D (22 X 34 in.) or A1 (594 X 841mm)
 - E (34 X 44 in.) or A0 (841 X 1188mm)
- Pen Types:
 - fiber-tip
 - roller-ball
 - reusable liquid ink drafting
 - disposable liquid ink drafting
 - overhead transparency
- Media Types:
 - chart paper
 - vellum
 - tracing bond
 - double-matte polyester film
 - glossy paper
 - overhead transparency film
- Either RS-232-C, RS-422-A or IEEE-488 interconnection capabilities
- Front-panel selectable bps rates of 75, 110, 150, 200, 300, 600, 1200, 2400, 4800, 9600, 19200
- Provides IBM 7375 software emulation mode, to insure 6186 compatibility with software that drives the 7375. In most cases, drivers for the IBM 6184, 7374 or Hewlett-Packard's 758xA will support the 6186 plotter.
- Improved features over the 7375 plotter:
 - Pen sorting algorithm (minimizes pen switches by plotting with the same pen until the buffer is empty)
 - 10M Hz 68000 controller (not processor bound due to short vectors)
 - Bi-directional plotting (less time required to move to the next vector)
 - 5.7g diagonal acceleration
 - More efficient graphics memory (contains pen sorting buffer and vector sorting buffer to decrease vector set-up time)
 - 22m sec. pen cycle time instead of 28m sec.
 - Combines "pen up" moves at all times (reduces "pen up" time by moving directly to the next "pen down" vector)
 - Uses Variable Reluctance instead of DC motors (prevents overheating due to increased throughput)
 - 19.2K bps rate instead of 9.6K (speeds transmission of data from the CPU to the plotter)
 - RS-422-A connection capability supported standard on every machine (allows plotter installation at a greater distance from the CPU)

The 6186 is simple and convenient to operate. Most plotter functions are controlled by the user's graphics software package. Therefore, professional-looking, high quality engineering drawings can be produced even by casual users.

6186 Attachments:

- RS-232-C: Attachment capability that conforms to electrical interface specifications EIA RS-232-C and CCITT V24.
- IEEE-488: Attachment capability that conforms to electrical interface specifications IEEE-488-1978.

The 6186 has been tested in the following IBM system configurations using the RS-232-C and/or IEEE-488-1978 interfaces and the interface cables listed below:

With Standard RS-232-C Interface:

- Attached to an IBM RT Personal Computer* via:

- The RT PC's standard 2-port RS-232-C adapter or its optional 4-port Asynchronous RS-232-C Adapter (#4763), or
 - An IBM 5085 Graphics Processor with an RT Personal Computer Modification (#6150)
- * RT PC, RT, and RT Personal Computer are trademarks of IBM Corp.
- Attached to an IBM Personal Computer (including PC, PC XT, PC XT Model 286, PC AT, 3270-PC, 3270-Personal Computer AT, PC XT/370 and PC AT/370)
 - Attached to a System/370, 30xx, 43xx, or 9370 processor via an IBM 5085 Graphics Processor equipped with a 3270 and RS-232-C Attachment Feature (#5510)

With Standard IEEE-488 Interface:

- Attached to a System/370, 30xx, 43xx, or 9370 processor via any of the following terminals equipped with the appropriate prerequisites:
 - IBM 3179 Color Graphics Display Station Model G10 or G20 with an IBM 3979 Expansion Unit
 - IBM 3270-PC/G and GX or 3270-PC AT/G and GX
- Attached to an IBM Personal Computer (including 3270-PC/G and GX and 3270-PC AT/G and AT/GX)
- Attached to an IBM Personal Computer (PC, PC XT and PC AT) with a GPIB Interface Bus Adapter

Note: Countries may not announce the 6186 for attachment to any system which has not been announced in that country.

Note: IBM cannot and does not represent that the 6186 will operate in any configuration which IBM has not tested.

Physical Specifications:

Height - 120.0cm (47 in.)
 Width - 134.6cm (53 in.)
 Depth - 40.8cm (20 in.)
 Weight -
 Net (model 1): 73Kg (160 lbs.)
 Net (model 2): 75Kg (164 lbs.)
 Shipping (model 1): 95Kg (210 lbs.)
 Shipping (model 2): 102Kg (225 lbs.)

Environmental Specifications:

Operating:

Temperature - 0 degrees C to 55 degrees C (32 degrees F to 131 degrees F)
 Relative Humidity - 5% to 95%
 Max Wet Bulb - 26.7 degrees C (80 degrees F)

Non-Operating:

Temperature - -40 degrees C to 75 degrees C (-40 degrees F to 167 degrees F)
 Relative Humidity - 5% to 95%
 Max Wet Bulb - 26.7 degrees C (80 degrees F)

Shipping:

Temperature - -40 degrees C to 60 degrees C (-40 degrees F to 140 degrees F)
 Relative Humidity - 5% to 100%
 Max Wet Bulb - 0.6 degrees C to 29.4 degrees C (33 degrees F to 85 degrees F) (No Condensation)

Operating Altitude: 0 feet to 2135 meters (7000 feet)

Programming Support: The 6186 can be controlled by any computer system that provides programming to generate ASCII-coded Graphic Language (GL) commands. Refer to the appropriate hard-

ware and graphics software documentation for required hardware configuration, supported DOS levels and interface availability.

The following hardware/software environments have been tested with the 6186:

- IBM RT Personal Computer:
 - Professional CADAM
 - Personal graPHIGS
 - CIEDS/Design Capture for IBM RT PC
 - CIEDS/Simulation for IBM RT PC
 - CAEDS for IBM RT Personal Computer
 - CATIA for IBM RT Personal Computer
 - RS/1
 - UNIRAS
- IBM 5080 Graphics System (with 5085 feature #5510) supported by the following IBM System/370, 30xx, 43xx or 9370 products:
 - IBM Industry Standard Plotting Commands (ISPC)
 - CADAM, CATIA, CAEDS, CBDS, CIEDS, GPG via ISPC
 - IBM Color Plotter Support for GDDM/GDF (CPS)
 - GDDM/graPHIGS via CPS
 - Graphical Display and Query Facility (GDQF)
- 3179-G1 and G2 via 3979 supported by the following IBM System/370, 30xx, 43xx or 9370 products:
 - GDDM
 - GDDM/graPHIGS via GDDM
- IBM 3270 PC/G and 3270 PC/GX supported by the following IBM System/370, 30xx, 43xx or 9370 products:
 - GDDM
 - GDDM/graPHIGS via GDDM
- IBM Personal Computer family:
 - MicroCADAM
 - CIEDS/Design Capture for IBM PC-AT
 - CADwrite
 - IBM SlideWrite
 - ANVIL-1000
 - AutoCAD
 - CADKEY
 - Design Board 3D
 - RoboCAD PC
 - VersaCAD Advanced
- IBM 3270 PC/G and 3270 PC/GX: IBM 3270 PC Color Graphics Applications
- IBM PC (GPIB adapter): General Purpose Interface Bus Programming Support

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 CATIA is a registered trademark of Dassault Systems.
 CBDS is a trademark of Bell Northern Research (Canada)
 CAEDS is a registered trademark of IBM Corp.
 CIEDS, graPHIGS, and CADwrite is are trademarks of IBM Corp.
 UNIRAS is a trademark of UNIRAS Incorporated.
 RS/1 is a trademark of Bolt, Beranek and Newman Inc.
 ANVIL is a trademark of Manufacturing Consulting Services
 AutoCAD is a trademark of Autodesk, Inc.
 CADKEY is a trademark of Micro Control Systems, Inc.
 Design Board 3D is a trademark of MegaCADD, Inc.
 Robo CAD PC is a trademark of Robo Systems Corp.
 VersaCAD is a trademark of T & W Systems, Inc.

Note: Information in this Announcement concerning non-IBM software is based on information obtained from individual vendors. IBM has not evaluated these offerings and makes no judgments with regard to their function, quality, or performance. There may be other vendors offering similar products who are not listed. The fact that a product is or is not listed should not be taken as an IBM endorsement, or lack of endorsement, of the product.

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Publications: Two publication will be shipped with this plotter:

- SH23-0093 IBM 6186 Color Plotter Guide to Operations (GTO)
- SH23-0094 IBM 6186 Color Plotter Hardware Maintenance Service (HMS)

An additional manual will be available as a feature for the 6186:

- SH23-0092 6186 Color Plotter Programming

Note: The GTO manual is available in English, German and Spanish. World Trade customers will receive both an English or a suitable language version (when available) of the GTO.

The HMS and Programming manuals will be available in English only.

SPECIFY

- Power:

100V AC, 1-Phase, 3-wire, 48-60 Hz

120V AC, 1-Phase, 3-wire, 48-60 Hz
220V AC, 1-Phase, 3-wire, 48-60 Hz
240V AC, 1-Phase, 3-wire, 48-60 Hz

- 105 Watts Maximum
- One line cord is supplied with each machine.
- Languages for Publications:

Specify Codes will be used to determine documentation language shipped.

Documentation is available in English, German and Spanish. One English or one translated (if specified) Guide to Operations will be supplied with each plotter. (Programming and Maintenance manuals will be available in English only).

Country	Specify	Power 48-60 Hz	Specify	Languages Guide to Operations
Argentina	#9520	220V	#2931	Span
Australia	#9515	240V		Eng
Brazil	#9911	120V		Eng
Canada	#9911	120V		Eng
Hong Kong	#2813*	220V		Eng
Indonesia	#2813*	220V		Eng
Japan	#2730	100V		Eng
Korea	#2730	100V		Eng
Malaysia	#2801	240V		Eng
Mexico	#9911	120V	#2931	Span
New Zealand	#9515	240V		Eng
Singapore	#2801	240V		Eng
Taiwan	#9911	120V		Eng
Venezuela	#9911	120V	#2931	Span

Note: Homologation requirements will be met where required by countries included in the above table.

Countries not listed above will be handled on an exception basis and will be limited to available power supplies, plugs and document translations. The plotters will not have been homologated or tested for use in countries other than those listed.

A country Safety Organization (i.e UL/CSA equivalent) approved adapter plug will have to be obtained locally to allow conversion of the wall plug in those countries where the specify code is marked with an asterisk (*).

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Cables: (Available as Accessories.) When ordering plotters, one interface cable for each plotter purchased may be ordered using the feature codes listed below.

Additional cables if required may be ordered by part number from ISSD.

#5020, P/N 5452377 - For IBM 5085 (10 ft. in length)

#5030, P/N 5458877 - RS-232-C cable for PC attachments (6 ft. in length)

Note: The IBM PC AT and 3270 Personal Computer AT require Serial Adapter Cable when attaching plotters. (P/N 6450242, IBM PC AT and 3270 Personal Computer AT feature # 0242)

The RT Personal Computer requires a Serial Printer Cable (10 pin) when attaching plotters. (P/N 6294803, RT PC Feature #4803) with the RT PC, plotter #5030 is not required.

#5040, P/N 5452378 - For IEEE 488 Interface (6 ft. in length)

Note: The IEEE-488 adapter on the 3270 PC/G and PC/GX includes a cable for the plotter attachment. (Cable purchase is not required if the plotter is the only device to be attached.) Additional devices may be attached to the same adapter. (One cable feature, #5040, is required for each device.) The IEEE-488 cable is required for plotter attachment to the 3270 PC-AT/G and PC-AT/GX.

#5060 - Drafting Plotter Supplies Kit - E Size is an optional feature that provides the additional supplies required in the first several months of operation. The kit includes: 4 packages of roller-ball pens, 10 packages of fiber-tip pens and 2 packs of E-size chart paper.

SUPPLIES

A starter kit of supplies is provided with each plotter to enable the user to utilize the 6186 upon receipt. Included are pens and plotting paper.

The 6186 utilizes existing supplies for the IBM 7375:

- A to E-Size Media

MACHINES

- Single Sheet Ledger Bond, Vellum, Tracing Bond, Polyester film, Glossy paper (A size), and Overhead Transparency film (A size)
- Roll-feed Ledger Bond (D and E size)
- Pen Types
 - Fiber-tip for Ledger Bond or Tracing Bond
 - Roller-ball for Tracing Bond or Ledger Bond
 - Reusable and Disposable Drafting for Vellum, Tracing Bond or Polyester film
 - Overhead Transparency for Overhead Transparency film or Glossy paper

The following new supplies are applicable to users of the 6184, 7374 and 7375, as well as the new 6186:

- Disposable Film Media Pens (0.25mm), P/N 5472601 (4/pack)
- Disposable Film Media Pens (0.35mm), P/N 5472602 (4/pack)
- Disposable Film Media Pens (0.50mm), P/N 5472603 (4/pack)
- Disposable Film Media Pens (0.70mm), P/N 5472604 (4/pack)
- Multi-color Roller-ball Pens (0.3mm)*, P/N 5456326 (4/pack)

* Roller-ball pens do not operate on the 6184

The following new supplies operate only with the 6186:

- Adjustable Carousel for All Pen Types, P/N 5472623
- Fiber-tip/Roller-ball Pen Boots, P/N 5472586 (8/pack)
- Drafting Pen Boots, P/N 5472587 (8/pack)
- Media Cutters, P/N 5472588

Supplies and Cables are available from Information Systems and Supplies Division (ISSD).



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MACHINES

M 6208.1
Apr 83
Major Revision

6208 AUDIO TYPING UNIT

PURPOSE

The 6208 Audio Typing Unit is an audio typing aid for the use of persons with impaired vision. It is a field attachable unit which may be connected to an 6128 Memory 100 Typewriter. This typing aid enables a person to actually listen to what the typewriter is doing and saying, and to review and revise what the operator has accomplished. The unit provides audio support from the moment the keyboard is turned on until an error-free document is taken out of the typewriter.

MODELS

Model 001 Console and Key Pad

Dimensions:

Width: 660mm (26 in.)
Length: 825mm (32.5 in.)
Height: 846mm (33.25 in.)
Weight: 43kg (96 lbs)

HIGHLIGHTS

- Standard Features are as follows:
 - Two Headset Jacks - Allows both operator and supervisor to hear the Audio Typing Unit with speaker off.
 - Headset Volume Control.
 - Speech Rate Control.
 - Audio Modes Button - Selects the pronounce, spell, or punctuation mode of audio response.
 - Keyboard Modes Button - Controls the "echoing" of keys on the host machine.
 - Playback Button - Controls whether audio is off or on during playback.
 - Print Button - Controls whether the element strikes the platen or not.
 - Line Button - Initiates audio review of a line.
 - Word Button - Initiates audio review of a word.
 - Character Button - Initiates audio review of a character.
 - Line Back Button - Positions audio review to the beginning of the line.
 - Word Back Button - Positions audio review to the beginning of the previous word.
 - Character Back Button - Positions audio review to the beginning of the character.
 - Line Number - Indicates vertical position on the page.
 - Position - Tells the location of the element from the left margin and where the last buffer review point is.
 - Move Button - Aligns element position and buffer review point for corrections.
 - Expand - Initiates audio review of a character by speaking a keyword.

SPECIFY

- Power

50Hz	60Hz
100V #7891	115V #7900
112.5V #7896	
123.5V #7897	
200V #7890	
220V #7893	
240V #7892	
- Keyboard Group:
 - United Kingdom/Australia #K101-1
 - French #K983
 - German #K982
- Color: Console -- specify #C030 for Raven Black, #C043 for Pebble Gray ... Key Pad -- specify #C043 for Pebble Gray, #C028 for Charcoal Gray.

SPECIAL FEATURES (None)

MODEL CONVERSIONS (None)

ACCESSORIES (None)

SUPPLIES

Each 6208 shipment to the customer will include the following:

- Installation Tool
- Operating Instructions
- Transcriber Cable Adapter

See your Country DP Supplies Coordinator. @SS@ Contact IBM.

6212 MAG CARD COMPOSER READER/RECORDER**PURPOSE**

The 6212 is a low console that uses standard 5,000 character magnetic cards for reading information from, or reading it to the composer memory. The 6212 will accept singly fed cards or a pack feed of up to 50 cards.

MODELS**Model 001**

Prerequisites: Must be connected to a 6625 Mag Card Composer Printer

Dimensions:

Width: 30.5cm (12 in.)
Depth: 48.3cm (19 in.)
Height: 67.3cm (26.5 in.)
Weight: 34 kg (75 lbs.)

HIGHLIGHTS

- Low Profile Card Console with Pack Feed.
- Pack Feed - 50 cards.
- Unlimited Offline Storage.
- Single Card Feed Slot with Stacker.
- Reads Cards at 240 CPS.
- Records Cards at 200 CPS.
- Standard Features are as follows:
 - MC Console: The 6212 is cable-connected to the 6625 Mag Card Composer Printer. It houses the high speed pack-feed card deck, the control electronics, and the power supply. The unit can feed cards from a stack of up to 50 cards in the hopper or accept a card through the single card slot. It can read or record a card, eject it into the card stacker, or eject it out the card slot under control of the electronics.

SPECIFY

- Power:

50Hz	60Hz
100V #M018	100V #M041
112.5V #M034	115V #M001
123.5V #M035	220V #M003
200V #M036	
220V #M028	
240V #M037	
- Line Cord: For AC, 2-wire no specify required, for AC 3-wire, specify Code #2008.
- Color: Charcoal Black with Pearl White faceplate #C041

SPECIAL FEATURES (None)**MODEL CONVERSIONS (None)****ACCESSORIES (None)****SUPPLIES**

6360 DISKETTE UNIT**PURPOSE**

The Diskette Unit is used for loading programs into memory and for housing work diskettes for the 6580 Displaywriter. It is available with either one or two diskette drives for use with either Displaywriter Diskette 1 or 2D. Information created at the keyboard can be read onto the diskette.

MODELS

Model 010: Single Diskette Unit - uses Diskette 1 only

Model 011: Dual Diskette Unit - uses Diskette 1 only

Model 020: Single Diskette Unit - uses Diskette 1 or 2D

Model 021: Dual Diskette Unit - uses Diskette 1 or 2D

Limitations: The data formats of these diskettes are not compatible with other IBM diskettes.

Prerequisites: The customer must have at least Textpack 2 to use the Diskette 2D.

Customer Setup (CSU): Yes (Single or Dual Diskette Unit).

HIGHLIGHTS**Diskette Characteristics:**

- Diskette 1 provides 284,160 bytes of customer-usable characters and control codes; up to 144 2,000-character pages.
- Diskette 2D provides 985,088 bytes of customer-usable characters and control codes.

Diskette Unit Configurations:

- Diskette 1 configuration - one or two diskette drives, 284,160 bytes per diskette.
- Diskette 2D configuration - one or two diskette drives, 985,088 bytes per diskette.

Benefits:

- Modular design accommodates left- or right-handed operators.
- Modular packaging provides for easy upgrading.
- Single-drive model provides low-cost option.
- Dual-drive model helps reduce diskette handling.
- Diskette 2D provides larger storage capacity.

DESCRIPTION**Physical Specifications:**

Width - 254mm (10 inches)
Depth - 398mm (15.7 inches)
Height - 292mm (11.5 inches)
Weight (Single) - 11kg (24 pounds)
 (Dual) - 16kg (35 pounds)
Cable Length - 1m (3.3 ft)

SPECIFY

- Color: Pearl White (no specify required).

SPECIAL FEATURES**Non-Communications Features**

Modification Feature for Diskette Unit (#6990, #6993): (#6990 for Single Diskette Unit, #6993 for Dual Diskette Unit) Available with 50 Hz or 60 Hz power. Designed to help protect the security of information being processed. Available for sales, delivery, installation, and maintenance in the U.S., to agencies of the U.S. Government located outside the U.S., and to governments of NATO countries plus Australia and New Zealand. There are no functional or operational differences between the standard Displaywriter and those equipped with the modification. Information regarding Modification Features must not be released, reproduced, or distributed outside the U.S. or divulged to non-U.S. citizens other than those authorized by the U.S. government. Maximum: 1 per device. Field Installation: No. Corequisites: The power selected must match the electronics module power.

Communications Features

Local Device Controller (LDC) (#1630): Allows limited distance attachment up to 5,000 feet of twinaxial cable to one other Displaywriter System on the 6670, for communication with Binary Synchronous Protocol at 2400 bps only. Both units must be equipped with an LDC. The customer is responsible for supplying, installing, and maintaining the twinaxial cable and station protectors (if required). Maximum: 1. Field Installation: Yes.

Additional EIA Interface for External Model (#3704): Provides an additional EIA interface for an external modem for either Binary Synchronous, Asynchronous, or SDLC (3270 Data Stream Compatibility) communications. Limitations: This device is for use only with the Local Device Controller (#1630) and cannot be used with the Single or Dual EIA Interface for external modems (#3705 or #3707). Maximum: 1. Field Installation: Yes.

Dual EIA Interface for Two External Modems (#3707): Provides communications capability for Binary Synchronous, Asynchronous, or SDLC (3270 Data Stream Compatibility) communications in 1 workstation. Similar to the Single EIA Interface, but includes an additional EIA interface to allow for 2 modems. See M6580 pages information on the Single EIA Interface (#3705). Maximum: 1 per workstation. Field Installation: Yes.

Modification Feature for Communication Interface (#4964): Designed to help protect the security of information being processed. Available for sales, delivery, installation, and maintenance in the U.S., to agencies of the U.S. Government located outside the U.S., and to governments of NATO countries plus Australia and New Zealand. There are no functional or operational differences between the standard Displaywriter and those equipped with the modification. Information regarding Modification Features must not be released, reproduced, or distributed outside the U.S. or divulged to non-U.S. citizens other than those authorized by the U.S. government. Limitations: Order 1 of these features in place of other communications interfaces. Maximum: 1 per device. Field Installation: No. power.

MODEL CONVERSIONS

- From Model 10 to Model 11.
- From Model 10 to Model 20.
- From Model 10 to Model 22.
- From Model 11 to Model 22.
- From Model 20 to Model 22.

MACHINES

ACCESSORIES (NONE)

SUPPLIES

IBM Displaywriter Diskette 1 (Reorder Number 4498905): The diskette consists of a thin, flexible disk and a protective plastic jacket. The diskette is protected by a plasticized envelope when it is not in use. Size: Approximately 203.2mm x 203.2mm (8 x 8 inches). Packaging: Permanently enclosed in a protective envelope identified by a permanent gray label with a bold "1". Recording/Storage Capability: 284,000 customer-usable characters.

IBM Displaywriter Diskette 2D (Reorder Number 4498959): The diskette consists of a thin, flexible disk and a protective plastic jacket. The diskette is protected by a plasticized envelope when it is not in use. Size: Approximately 203.2mm x 203.2mm (8 x 8 inches). Packaging: Permanently enclosed in a protective envelope identified by a permanent terra cotta (burnt orange) label with a bold "2D". Recording/Storage Capability: 985,000 customer-usable characters.

Note: The IBM Displaywriter Diskettes 1 and 2D are pre-initialized diskettes for the IBM 6580 Displaywriter. Initialization is the pre-recording of data which organizes a diskette into fields, tracks, and sectors conforming to the unique logic of the IBM 6580 Displaywriter. If the customer desires un-initialized Diskettes 1 and 2D, which are commonly used in various IBM products, see IBM.



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MACHINES

M 6361.1
Nov 83

6361 MAG CARD UNIT

PURPOSE

Provides magnetic card input and output for the 6580 Displaywriter System.

MODELS

Model 001

Limitations: 50 magnetic card capacity.

Maximum: One Mag Card unit per 6580 System.

Prerequisites: Require Minimum of 192KB memory and Textpack 2.

Dimensions:

Width: 305mm (12 in.)
Depth: 483mm (19 in.)
Height: 673mm (27 in.)
Weight: 30kg (65 lbs.)
Cable Length: 4.5m (15 feet)

Note: The 6361 is a reconditioned product (not in new production) that does not qualify for new investment tax credit.

HIGHLIGHTS

Reads and records information using 50 track magnetic cards. Reading is at the maximum rate of 20 seconds/card (102 char/track). Recording is at the maximum rate of 30 seconds/card (102 char/track). Mag card products may be used to prepare the cards to be read by the 6361. Playback of the cards recorded by the 6361 can be on Mag Card Selectric® Typewriters, Mag Card 11, 6640 Document Printer, Mag Card/A, 6240 Communicating Mag Card Typewriter, and the 6670 Information Distributor. The input hopper holds a maximum of fifty cards and the output stacker a maximum of 200 cards.

Information on magnetic cards can be read and recorded on the 6580 Displaywriter System diskette for revision, printing, or storage. In some cases, information from magnetic cards may need to be edited before information is revised or printed.

Bibliography: See *KWIC Index* (G320-1621).

SPECIFY

- Power:

50 Hz 100V #7888 112.5V #7896 123.5V #7897 200V #7890 220V #7893 240V #7892	60 Hz 100V #7898 115V #7900 115V #7950 (Voltage Select) 220V #7894
---	--
- Power Cord: 2.4 meters (1.9m - Thailand)
- Color: Pearl White Covers with Black Face Plate (no specify required).

Language Group:

Canadian French #2155 Spanish #2262
English #2257

SPECIAL FEATURES

Modification Feature for Mag Card Unit (#6989): Order in addition to a Mag Card Unit. Available with 60 Hz 110V power only. The Modification Features are designed to help protect information being processed. These features are applicable to 6580 Displaywriter Systems equipped with 60 Hz power supplies and are available for sales, delivery, installation and maintenance in the United States, and to agencies of the United States Government located outside the US, and to governments of NATO countries plus Australia and New Zealand. Information regarding Modifications Features must not be released, reproduced, distributed outside the United States or divulged to non-US citizens other than those authorized by the US government.

MODEL CONVERSIONS (None)

ACCESSORIES (None)

SUPPLIES

Magnetic Cards: Only diagnostic magnetic cards are shipped with the 6361. Magnetic cards for customer applications must be separately ordered. For IBM magnetic cards and erase magnetics, see IBM.

6580 DISPLAY STATION

PURPOSE

The 6580 is the Display Station for the 6580 Displaywriter System. It consists of an Electronic Module (contains specified bytes of random access memory), a Display Module (either a 25-line display or a 66-line large display) and a Keyboard (either 96 or 92 characters).

The 25-line display has 80 characters per line. The 66-line large display has 100 characters per line.

Attachable to the 6580 Display Station are:

- 5215 Selectric(R) Element (15 cps) Printer, 5218 Printwheel Printer (40 or 60 cps) or 5228 Printwheel Printer - Wide Carriage (60 cps).
- 6360 Single or Dual Diskette Unit.
- One 6361 Mag Card Unit per 6580.
- Up to two other Display Stations may be attached to the master Display Station and thereby share one Printwheel printer.

MODELS

Model	Memory	Display Size
A0E	128KB	25-Line
A01	160KB	25-Line (WITHDRAWN)
A02	192KB	25-Line
A03	224KB	25-Line (WITHDRAWN)
A04	256KB	25-Line
A06	320KB	25-Line
A08	384KB	25-Line (Required to operate RPQ/PRPQ 3277 Device Emulation Adapter concurrently with Textpack 6.
A10	448KB	25-Line
B0E	128KB	Large Display
B02	192KB	Large Display
B04	256KB	Large Display
B06	320KB	Large Display
B08	384KB	Large Display (Required to operate RPQ/PRPQ 3277 Device Emulation Adapter concurrently with Textpack 6.
B10	448KB	Large Display

Customer Setup (CSU):

- Adequate site, system and other vendor preparation.
- Receipt at the customer's receiving dock, unpacking and placement.
- Physical setup, connection of cables to TP lines/modems.
- Notify IBM of intent to relocate, advise IBM of the new location and follow IBM instructions for relocation.
- Other specific responsibilities as outlined in the IBM Planning and Site Preparation Guide.
- Attend Customer Orientation Seminar for demonstration setup.
- Notify IBM in advance if setup assistance is required.

HIGHLIGHTS - 6580 DISPLAYWRITER SYSTEM

Displaywriter System consists of at least one workstation. Each workstation has a display station (a display module, a keyboard module, and an electronics module) and a diskette unit for reading and recording information on data diskettes. A printer is recommended for a full text processing system, but is not required. A Mag Card Unit is also available for organizations that already have mag card typewriters.

The Displaywriter System is a family of software-driven, key-to-display products, with several important concepts incorporated in its design:

- Shared resource system - Up to three workstations may share a single, high-speed printwheel printer, thus increasing throughput and reducing the cost per typing station.
- Designed to be easy-to-learn and use - Simple-language labelling, logical leading prompts, and straightforward presentation of menus all add to ease of learning and use, and help increase operator productivity.
- Modular architecture - Hardware components and software programs are packaged individually, allowing customers to select programs as needed.
- Ergonomically designed - Applying the science of adapting work and working conditions to the worker helps to reduce operator fatigue, make the system easier to use, and contribute to its attractive look.
- Designed to provide excellent price performance - The user buys only the hardware components and software programs needed, and expands the system as needs change.

Customer Objectives and Applications:

- Heavy original typing production
- Repetitive text production
- Heavy revision production
- Columnar and math operations
- Foreign-language spelling check
- Enhancement of IBM products
- Participation in a communications network
- Low cost per workstation
- Designed to provide excellent price performance
- Proofreading aid

Hardware: The Displaywriter System hardware consists of several modules, cable-connected by the user:

- Workstation
 - Electronics Module
 - Display
 - Keyboard
 - Diskette Unit
- Printers
 - Selectric Element (15 cps)
 - Printwheel (40 or 60 cps)
 - Printwheel - Wide Carriage (60 cps)
- Optional equipment
 - Sheet-Feed Paper Handler - Available for the Printwheel Printers
 - Tractor Feed - Available for the Printwheel Printers
 - Mag Card Unit

Software: Tasks are performed through licensed programs, available for a license fee. Programs are packaged on program diskettes, and may be obtained as the customer needs them. Although the programs themselves cannot be modified by the cus-

torner, formatting defaults and the Spelling Dictionary may be personalized.

Benefits: The highly modular nature of the hardware and software offers several user benefits:

- Logical configuring to meet current needs
- Flexible system upgrading and expansion in the field as customer needs change
- Fast and convenient field hardware maintenance
- Good system price performance
- Convenient placement of system modules

COMMUNICATIONS

Communications on the 6580 System is available with the following licensed programs:

- Asynchronous Communication, 5608-SR1
- Binary Synchronous Communication, 5608-SR2
- IBM 3270 Data Stream Compatibility, 5608-SR6

Using one of the licensed programs and the communications feature, the 6580 System can send information from another 6580 System workstation or other compatible communication equipment, including a suitably programmed host computer. The equipment involved in the 6580 System communication process can be located in the office next door or on another continent.

Communications on the 6580 System is an important capability because:

- Documents that are typed and stored can be translated into electronic signals sent over telephone lines at transmission speeds up to 9600 bps.
- Documents that are received at a 6580 System workstation can be stored and printed or can be revised by the operator. (Documents received from compatible communication equipment may need additional editing or reformatting if revisions are necessary.)
- With the Asynchronous, Binary Synchronous, and communication programs, text and control codes can be created and edited offline on the 6580 System. This ensures faster, more accurate transmission and can reduce line and computer connect charges. (The 3270 Data Stream Compatibility licensed program allows the operator to communicate while directly connected and online to a host computer.)
- When the communication program is not needed, the 6580 System can be used to perform other word processing applications.

Equipment Required: The communication function requires a:

- Licensed text program
- Communication adapter on the 6580 System (includes a 3.8 meter/12.5 foot EIA cable)
- Licensed communication program
- An external modem (depending on the modem selected, a data coupler may be required)
- Communication line

The 6580 System can optionally support two external modems. The modem is selected by menus provided by the licensed program. Each modem can support a different linespeed and/or protocol. Only one modem and communication licensed program can be active at one time.

Security Capabilities: An optional security keylock may be installed to prevent unauthorized access to the communication function.

The 3845/3846 encryption devices support the 6580 System. When connected between the 6580 System and the external modem at each end of a communication line, these devices secure the privacy of the data transmitted by automatically encrypting (scrambling) and decrypting (unscrambling) the data.

In addition to these optional security features, a terminal identifier (terminal ID) may be preset by the customer. Depending on the licensed product, user IDs are also available and may be assigned for additional communication security.

Communication Protocols: Three communication protocols, Asynchronous, Binary Synchronous, and SNA/SDLC Communications, are available.

The Asynchronous Communication licensed program uses the asynchronous protocol. The Binary Synchronous Communication licensed program uses binary synchronous protocol. The 3270 Data Stream Compatibility licensed program uses the SNA/SDLC protocol.

Asynchronous Communication: In most applications, Asynchronous Communication is used for interactive terminal operations; however, it can also be used for batch communications because data can be stored in advance on diskette and received to diskette. During an active communication session, both interactive and batch communications can be intermixed.

The 6580 System provides three operating modes that emulate the characteristics of the following asynchronous devices:

- IBM Communicating Mag Card Selectric Typewriter
- IBM 2741 Communications Terminal
- Teletypewriters similar to the Teletype 33, 35, or 43 KSR (Keyboard Send-Receive) mdls.

Binary Synchronous Communication: In Binary Synchronous Communication (BSC) protocol, the 6580 System emulates the characteristics of either a 2770/3780 or 2780 terminal. This communication function enables the 6580 System to communicate with the following:

- Mag Card II Typewriter - Communicating
- 6240 Mag Card Typewriter - Communicating
- 6640 Document Printer - Communicating
- Office System/6 - Communicating
- 6670 Information Distributor
- 5520 Administrative System
- 6580 Displaywriter System - Communicating
- S/36
- A suitably programmed computer.

Binary Synchronous Communication licensed program utilizes batch transmission of data. All information, including any necessary control language, is prepared before beginning the communication session. After the session has begun, the information is sent and received with minimal operator intervention.

3270 Data Stream Compatibility: The 3270 Data Stream Compatibility licensed program allows a 6580 System to access suitably programmed IBM host computer systems using 3270 application programs. (In most cases, no changes to the computer application programs are required.) Communications to the suitably programmed IBM host is through SNA/SDLC communication protocol.

A communicating 6580 System using the 3270 Data Stream Compatibility licensed program appears as a 3270 Information Display System to the following suitably programmed IBM host systems:

- S/370

- 3031/3032/3033/3081 Processor Complexes
- 4300 Processors

The 3270 Information Display System emulated consists of a single 3278 mdl 2 or 4 Display, a 3274 mdl 51C Controller, and, optionally, a single 3287 Printer.

HIGHLIGHTS - 6580 DISPLAY STATION

Standard Features

Electronic Module: The Electronics Module, a component of the Display Station, contains most of the logic for the Displaywriter System. This module includes replaceable plug-in cards which provide the system with specific functional capabilities. Some of these cards are:

- Microprocessor - The powerful high-speed microprocessor provides each workstation with independent intelligence. Its technology allows sophisticated system architecture and true foreground/background concurrency. This means that printing can take place in the background, while keyboarding or revising occur in the foreground.
- ROS Memory - The Basic Assurance Test and the logic necessary to load programs into memory from program diskettes are contained in Read-Only Storage (ROS).

Main Storage Memory Card: This card contains the Random Access Memory (RAM) for the system. Minimum RAM capacity is 128K bytes, and it is expandable in 64K-byte increments. RAM is used for storage of both program instructions and customer information. RAM is a volatile memory; its contents are lost when the power is turned off.

Highlights of the Electronic Module

- Processing capability provides good performance and the capability for system expansion.
- Logic is at the workstation level, independent of other stations.
- Concurrency of foreground and background tasks to increase operator productivity.
- ROS memory provides system checkout functions and start-up procedures, to help reduce setup time.
- RAM accommodates programs and customer information.
- Ergonomic design provides low levels of heat and noise.
- Flexibility accommodates a variety of hardware modules and software licensed programs.

Specifications of Electronic Module:

Width: 483mm (19 in.)
Depth: 356mm (14 in.)
Height: 178mm (7 in.)
Weight: 14kg (30 lbs.)

Display: A display is the primary means of visual interaction between the operator and the system. There are two models available: a 25-line display and a 66-line large display. The 6580 Display's ergonomic design and functional features help to enhance the system's effectiveness and minimize operator fatigue. The Display, a component of the 6580 is used to:

- Present menus
- Prompt the operator
- Give messages
- Provide system status information
- Display information

Functional Characteristics:

- Horizontal segmentation up to 255 characters, with 20-character overlap

- Vertical scrolling across page boundaries
- One level of Half Index
- Character brightening when censored
- Video-reversing of unrecognized words following spelling checking

Physical Characteristics of Display Station:

- 25-line capacity, 80 characters per line or 66-line capacity, 100 characters per line
- Operator-adjustable contrast and brightness (25-line display)
- Operator-adjustable brightness (66-line display)
- 30-degree rotate range
- 20-degree vertical tilt
- 8x16 dot character box
- Monopitch
- Symbol graphics displayed

Specifications of 25-Line Display:

Width: 381mm (15 in.)
Depth: 348mm (13.7 in.)
Height: 292mm (11.5 in.)
Weight: 6.6kg (15 lbs.)
Cable Length: 610mm (24 in.)

Specifications of 66-Line Large Display:

Width: 316mm (12.4 in.)
Depth: 404mm (15.9 in.)
Height: 404mm (15.9 in.)
Weight: 17.55kg (39 lbs.)
Cable Length: 483mm (19 in.)

Keyboard: The Keyboard, a component of the 6580 is the primary means of entering new information into the system. The 6580 Keyboard's logical layout is designed to be easily learned and productively used.

Physical Characteristics:

- Standard 96-character, optional 92-character
- Minimal inboard coding
- Function keys grouped and labelled logically

Keyboard Specifications:

Width: 538mm (21 in.)
Depth: 213mm (8 in.)
Height: 101mm (4 in.)
Weight: 5kg (11 lbs.)
Cable Length: 1m (3.3 ft.)

ATTACHABLE COMPONENTS

Diskette Unit: The Diskette Unit is used for loading programs into memory and for housing work diskettes for the 6580 Displaywriter. It is available with either one or two diskette drives for use with either Displaywriter Diskette 1 or 2D. Information created at the keyboard can be read onto the diskette. See M6360 pages for details.

Printers

Selectric Element Printer

- Rated burst speed of up to 15.5 cps.
- Well suited for standalone workstation configuration.
- Compatible with many Selectric Typewriter 10 and 12 pitch elements.
- System software provides "Trail Printing" capability allowing playout of one job, while another is being keyed.
- The Selectric Element Printer is a reconditioned product and may not qualify for new investment tax credit. This statement should be included in all proposals.

See M5215 pages for details.

Printwheel Printers

- Rated burst speeds of up to 40 or 60 cps (in 10 pitch).
- Prints with 10 pitch, 12 pitch, PSM, or 15 pitch printwheels.
- System software and a hardware prerequisite allow a "shared resource" arrangement with up to three workstations.
- Snap-in ribbon cartridge and printwheel cartridges are designed for easy insertion and removal of printwheels and ribbons.
- Bidirectional printing.

See M5218 and M5228 pages for details.

Mag Card Unit

- 50 magnetic card capacity.
- Serves as added information resource by taking information from magnetic cards.
- Functions as a media link with compatible IBM mag card products.
- The Mag Card Unit is a reconditioned product that does not qualify for new investment tax credits. This statement should be included in all proposals.

See M6361 pages for details.

Bibliography: See "KWIC Index" (G320-1621).

SPECIFY

- Power

50 Hz		60 Hz
#7878 100 - 127V		#7880 100 - 127V
#7879 200 - 240V		#7900 115V
		#7881 200 - 240V
- Color: Pearl white with pebble gray (no specify required).
- Language Group: Machine nomenclature (except keyboard) and customer setup documentation.

Canadian French	#2155
English	#2257
Spanish	#2262

Keyboard Module - 96 Characters: The following lists the country, the keybutton engraving language, the ID, and the feature code in that order:

Australia/New Zealand, English, 001, #5360
 Canada/English, English, 037, #5333
 Canada/French, French, 039, #5334
 Japan English, English, 069, #5359
 Latin American, Spanish, 025, #5345
 United States, English, 001, #5330
 United States, English, 001, #5331*

* = 92 characters

The Display and Keyboard Module which are available above as a feature for the Display Station need not be installed on the same terms as the Electronics Module and are available separately. See 6580 Displaywriter System elements in Country Keyboards section.

SPECIAL FEATURES

Non-Communications Features

Communication Keylock (#6500): Allows a level of security to help prevent unauthorized personnel from using the communication feature. Maximum: One. Field Installation: Yes.

Chartpack Display Adapter (#6955): Required to support Chartpack licensed program (PP 5608-SRA) with either 25-line or large display. Maximum: One per display station. Field Installation: Yes, by CSD. Customer Setup: Yes, if shipped with the display station.

Mod Feat for Elec Mod Mdls A0x #7022 and for 25-Line Display Mod (#4961): Order in addition to an Electronics Module. Available with 50 Hz or 60 Hz power. Designed to help protect the security of information being processed. These features are available for sales, delivery, installation and maintenance in the United States, and to agencies of the United States Government located outside the US, and to governments of NATO countries plus Australia and New Zealand. There are no functional or operational differences between standard Displaywriters and those equipped with Modification Feature. Information regarding Modification Features must not be released, reproduced, or distributed outside the United States or divulged to non-US citizens other than those authorized by the US government. Maximum: One per device. Field Installation: No.

Note: It is IBM's opinion based upon test data filed with the US Government*, that the Keyboard Module (features #5330, #5331, or #5349), Printer Sharing Feature, and its associated cables do not require modification for use in an environment requiring Modification Features.

* It is IBM's opinion and not a warranty that these components do not require modification. This shall be communicated orally and in writing prior to accepting an order from the customer. If a customer does not have access to the US Government classified test data, IBM may be unable to sell the Modification Features because the customer cannot obtain the necessary data that is required to support a buying decision.

Printer Sharing Prerequisite (#7997): A logic card that is placed in a designated master 6580 Display Station that will assume control of the printer in a shared printer configuration with up to three workstations. Specify: #7998 for a 60 meter (196.8 ft) cable, and #7992 for a 30 meter (98.4 ft) cable, and #7999 for a 5 meter (16.4 ft) cable to connect the second or third workstation to the designated master workstation in a printer sharing environment. Maximum: For printer sharing only, one prerequisite in the master workstation is required. A second prerequisite may be installed as backup if desired in one of the other two Display Stations. Field Installation: Yes. Customer Setup: Yes.

3274/3276 Attached Workstation Adapter (#8332): Permits dual cable attachment of the Displaywriter workstation to a 3274 or 3276 Control Unit, or to a 4361 Display Adapter Workstation Adapter, in order to emulate the 3278 Display and 3287 Printer. Refer to the 3270 Attached Workstation licensed program (PP 5608-SR9) for description of the capabilities. May coexist with feature #3705 in display station and feature #3707 in diskette unit, but can not coexist with printer sharing feature (#7997) or DW-3277-DE RPK (#8D0098). Maximum: One per display station, but not in master display station in printer sharing environment. Field Installation: Yes, by CSD. Customer Setup: Yes, if shipped with display station.

Communications Features

Single EIA Interface for External Modem (#3705): Provides communication capability in either Asynchronous, Binary Synchronous or SDLC (3270 Data Stream Compatibility) modes. It includes an EIA interface attachment for an external modem. This attachment requires a customer provided modem. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

MACHINES

MODEL CONVERSIONS

Electronic Module: Field upgradable in size of RAM (in 32K byte or 64K byte increases) and from model A to model B.

ACCESSORIES

Cables: IBM shielded twisted-pair cable (or equivalent) or coaxial cable is required for product attachment to the 327X. Cable and associated accessories can be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-Pair Cable: For proper identification, installation, and application of cable and associated accessories, refer to IBM Cabling System - Planning and Installation Guide, GA27-3361. For pricing and ordering information refer to the Systems Supplies operation within your country.

Coaxial Cable: For proper identification, installation and application of cable and associated accessories, refer to IBM 3270 Instal-

lation Manual - Physical Planning, GA27-2787 and Coaxial Cable and Accessories Manual, GA27-2805.

Palm Rest (#7996): The Palm Rest attaches to the keyboard module and is available as an MES only (purchase only). Customer Setup: Yes.

SUPPLIES

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Displaywriter (Diskette 1) (#5880): Each starter Pac contains 30 diskettes packed in a "fiftifile".

Displaywriter (Diskette 2) (#5887): Each starter Pac contains 30 2D diskettes packed in a "fiftifile".

Displaywriter (Diskette 2) with Printwheel Printer (#5889): Each kit contains 30 diskettes packed in a "fiftifile", 12 IBM 463 ribbons, and three printwheels; one Courier 10, one Rhetoric and one Essay.





SNO9 - C 308

SERVICE FOR CONSULTANTS - 1987 No. 2D

Date: 12/30/87

This publication is intended for use by those members of the data processing community who need this information in their work as consultants in the field of data processing and/or for those who directly or indirectly assist the users of IBM data processing systems in the installation and application of such systems.

The material contained in this manual and the supplements thereto has been prepared primarily for the general guidance of consultants and technical personnel. It includes technical information relative to IBM equipment and programs, but is not designed to be all-inclusive or to necessarily represent the exact status of equipment or programs, at any point in time.

Machines which are shown in this manual as withdrawn are no longer available from IBM. Data concerning these machines is provided for information purposes only. If available, certain features may be ordered for withdrawn machines. A Request for Price Quotation (RPQ) is required before such a feature can be ordered.

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6670 INFORMATION DISTRIBUTOR

NO LONGER AVAILABLE ... supplies will continue to be available.

PURPOSE

The 6670 Information Distributor is a multi-function machine which can operate as a text formatter, text printer, communications terminal, and a convenience copier (mdls 001 and 002 only).

MODELS

Model 001: Communication speeds up to 4800 bps for BSC and 7200 bps for SNA/SDLC. Must specify US or World Trade version. Includes convenience copy function.

Model 002: Communication speeds up to 9600 bps for BSC and SNA/SDLC. Includes font availability function which supports font downloading, and convenience copy function.

Limitations: Font availability function is only available on mdl 002. Semi-automatic, document feed, and convenience copier are only available on mdls 001 and 002.

Dimensions: (All mdls)

Width - 198cm (78 in.)
Depth - 70cm (27.5 in.)
Height - 102cm (40 in.)
Weight - 653kg (1,440 lbs.)

HIGHLIGHTS

The 6670 Information Distributor operates as a remote batch terminal when communicating with a host system. It cannot be channel attached. Host systems input may be read into the 6670 from magnetic cards for communication to a host system. Output from the host system may be sent directly to the printer, or to the internal diskette for later recording on magnetic cards. Standard 11 x 14-1/2 inch computer reports can be printed on 8-1/2 x 11 inch paper. Specially designed fonts print lines 132 characters wide (13.3 cpi) and 66 lines per page (8.57 lpi). With suitable programming in the host system, the 6670 can be an intelligent remote printer providing duplex printing, multiple font selection, multiple sets of output documents, and other printing functions which can be invoked by 6670 Operator Control Language (OCL). Documents formatted by a host system text formatting program, such as the ATMS III formatter or the SCRIPT/VS component of the Document Composition Facility, can be readily printed by the 6670.

The 6670 also operates as a printer for compatible Word Processing systems. Additionally, information may be communicated from a 6670 to another 6670 or to a compatible Word Processing system.

Printer: (All mdls)

- Prints from magnetic cards or communications line.
- Utilizes stored formats (see "Internal Storage Diskette").
- Laser printhead directs proper imaging on photoconductor.
- Print exit pocket, capacity 2,700 sheets/20 pound bond (or 75g/sq.m).
- Jobs or sets within jobs may be selectively offset 1/2 inch for easy separation.
- Duplexed printing (printing on both sides of the page).
- Primary paper drawer, 2,100 sheets/20 pound paper (or 75g/sq.m).
- Alternate paper drawer, 600 sheets/20 pound paper (or 75g/sq.m).
- Both paper drawers support a variety of paper sizes, but only one size at a time.
- Duplex tray capacity, 75 sheets.

- Four hardware fonts are standard; two additional hardware fonts or software fonts are optional.
- An optional Font Library is available for selected host operating systems for downloading fonts to mdl 002
- Up to four type styles per page, and up to six per document.
- Self-advancing photoconductor.

Internal Storage Diskette: (All mdls except as noted)

- Mdl 001 provides for approximately 210,000 characters of temporary storage for user data. Mdl 002 provide approximately 241,000 characters of temporary buffered storage for user data and downloaded fonts.
- Customer Engineer diagnostics.
- Contains control program.
- Contains stored formats (defined by customer) to control text formatting and communications.
- Eight text processing formats
- Two communications formats.

Magnetic Card Reader/Recorder: (All mdls)

- Identical to reader/recorder on Mag Card II Selectric Type-writer.
- Reads at up to 240 cps.
- Records at up to 200 cps.
- Data to be recorded can be from mag cards or from communications.

Copier: (Mdls 001, 002)

- Similar to Series III mdl 10.
- First copy speed - 7.5 seconds.
- Subsequent copies - 1.65 seconds each (36 copies/minute).
- Exit tray capacity - 300 sheets.

Control Panel: (All mdls except as noted)

- Used to control copy functions (mdls 001, 002).
- Used in conjunction with OCL and magnetic cards to control printing and communication.
- Lighted pushbuttons, lighted messages and LED display.

Font (Type Styles)

- **Group I Fonts:** These are hardware fonts, which are paired as shown in Group I listing in the "Specify" section. Four type styles (two per font card) resident as standard with the 6670. Two additional type styles may be selected as an option at an extra charge (at time of order or via MES). Selection is made from the Group I font pairings, shown in the "Specify" section below.
- ***Group II Fonts:** These are software fonts, and may be ordered individually, as an option at extra charge, by numbers shown in the "Special Features" section below. Prerequisites: #8400 and #8401.
- **Group III Fonts:** (Mdl 002) These are host-downloadable fonts. Prerequisites: #8400 and #8401. See "Special Features" below for fonts provided.
- **Communications Facilities:** (All mdls except as noted) Support is provided for BSC (Binary Synchronous Communications) or SDLC (Synchronous Data Link Control). These protocols are not co-resident; only one is installed per machine and must be specified at order entry. In addition, one of the communications Special Features must be ordered. An MES is available for converting from BSC to SDLC (and vice versa). This MES is field installable by the Customer Service Representative. To order, use the RTOE system and the appropriate code number for the protocol required, found in "Specify" below.
- **BSC Capabilities:**
 - 6670 BSC support is as a 2770, 3770, or 3780.

- The following host systems and processors support the 6670: S/360, S/370, 30XX, 43XX, S/3, S/32, S/34, S/36, S/38 and Series/1.
 - The communications adapter on the 4331 may be used.
 - 6670 to 6670 and Displaywriter.
 - Can transmit or receive data without interruption while copying, (copying only on mdl 001 and 002).
 - Communication line speeds for mdl 001 are 600 to 4,800 bps. For mdl 002, line speeds supported are 600 to 9600
 - Switched communication line operation, which includes the capability for the 6670 to automatically answer and disconnect via a suitable modem.
 - Nonswitched communication line operation, which includes the capability for the 6670 to operate in switched network backup mode with appropriate modems.
 - Synchronous clocking, which provides the 6670 with its own timing signals for operating at 1200 or 600 bps in case the modem used does not provide signals.
 - Half-speed operation, which, with the appropriate modem, enables the 6670 to operate at half the normal transmission speed.
 - Transparency, which enables the 6670 to send and receive all EBCDIC control and graphic codes.
 - Space expansion, which allows the 6670 to insert the specified number of spaces in compressed data as it is received.
 - Variable block size which is specified through OCL as 128, 256 or 512 bytes.
 - Buffered send, which allows the 6670 to transmit data from internal storage.
- SDLC Capabilities:
 - SDLC support is as a logical unit type 4 under SNA. The following host systems and processors support 6670 as an SDLC device: S/370, 30XX, 43XX, 8100 and 5520.
 - The communications adapter on the 4331 may be used.
 - SDLC communications requires a 3705 communications controller. 6670 to 6670 may be SDLC.
 - Can transmit or receive data without interruption while copying, (copying only on mdls 001 and 002).
 - Switched communication line operation which includes the capability for the 6670 to automatically answer and disconnect via a suitable modem.
 - Nonswitched communication line operation, which includes the capability for the 6670 to operate in switched network backup mode with appropriate modems.
 - Synchronous clocking, which provides the 6670 with its own timing signals for operating at 1200 or 600 bps in case the modem used does not provide signals.
 - Half-speed operation, which, with the appropriate modem, enables the 6670 to operate at half the normal transmission speed.
 - Space and character expansion, which allows the 6670 to insert the specified number of spaces or characters compressed data as it is received.
 - Block size fixed at 256 bytes.
 - Buffered send, which allows the 6670 to transmit data from internal storage.
 - Transmission Codes: The 6670 communication facility operates with any of two transmission codes, depending on the application. These are: the Extended Binary Coded Decimal Interchange Code (EBCDIC), and the American National Standard Code for Information Interchange (ASCII).

Bibliography: G544-1006.

SPECIFY

- Energy Group:

Voltage	Phase	Code
220V	1	#E051
220V (with neutral)	3	#E052
220V (w/o neutral)	3	#E053

220-230-240V	1	#E054
220-230-240V (with neutral)	3	#E055
220-230-240V (w/o neutral)	3	#E056
220-240V (Australia)	3	#E066

- Line Frequency Group: 60 Hz (Canada) #7906 -- 50 Hz (All other countries) #7905
- Control Panel Group: English Language #A135 -- International Symbol #A136
- Communication Protocol: Binary Synchronous (BSC) #1525 -- Synchronous Data Link Cont'l (SDLC)#1526

In order to use the communications capabilities of the 6670, one of the communication special features must be ordered. See "Special Features" for details. For Protocol Conversion on Installed Machines: To convert from one protocol to the other (BSC to SDLC, or vice versa), specify the appropriate code shown above. Conversions are field installable by the Customer Service Representative through an MES.

- Color: Pebble Gray and Pearl White (no specify required).

- Paper Group:

Group 1 #P876 *

203 x 267mm (8.0 x 10.5 in.)
216 x 279mm (8.5 x 11.0 in.)
216 x 330mm (8.5 x 13.0 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 2 #P877

210 x 297mm (8.2 x 11.6 in.)
216 x 279mm (8.5 x 11.0 in.)
216 x 330mm (8.5 x 13.0 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 3 #P878

203 x 254mm (8.0 x 10.0 in.)
203 x 330mm (8.0 x 13.0 in.)
210 x 297mm (8.2 x 11.6 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 4 #P879

210 x 270mm (8.2 x 10.6 in.)
210 x 297mm (8.2 x 11.6 in.)
210 x 310mm (8.2 x 12.2 in.)
216 x 356mm (8.5 x 14.0 in.)

* Supplied as standard if no other paper group is specified.

- Language Group: (for internal labeling)

English	#2257	German	#2259
English/French		Italian	#2261
(Canada Only)	#2264	Spanish	#2262
French	#2258		

- Font Selection: Hardware fonts, select two pairs from Group I fonts in listing shown below. All mdls of the 6670 provide four fonts (type styles) as standard. These fonts are resident in hardware and are paired in pre-determined sets. They are shown below as Group I fonts.

Group I Type Styles: (US character sets)

1. Courier	10-pitch	
Prestige Elite	12-pitch	#A490
2. Data 1 Rotated	13.3-pitch,	
Symbol	dual case	
	12-pitch	#A491
3. Prestige Pica	10-pitch	
Letter Gothic	12-pitch	#A492

- | | | | |
|----|----------------|-----|-------|
| 4. | Essay Standard | PSM | |
| | Essay Italic | PSM | #A493 |
| 5. | Essay Standard | PSM | |
| | Essay Bold | PSM | #A494 |

Group I Type Styles: (World Trade Character Sets)

- | | | | |
|----|----------------|------------|-------|
| 1. | Courier | 10-pitch | |
| | Data 1 Rotated | 13.3 pitch | #A495 |
| 2. | Prestige Elite | 12-pitch | |
| | Symbol | 12-pitch | #A496 |
| 3. | Essay Standard | PSM | |
| | Essay Italic | PSM | #A497 |
| 4. | Essay Bold | PSM | |
| | Letter Gothic | 12-pitch | #A498 |
| 5. | Prestige Pica | 10-pitch | |
| | Data 1 Rotated | 13.3 pitch | #A499 |
| 6. | Essay Bold | PSM | |
| | Essay Standard | PSM | #A500 |

SPECIAL FEATURES

COMMUNICATIONS FEATURES

Limited Distance Control (LDC) (#3711): Provides capability to locally attach a 6670 (all mdls) to a 5520 operating under SNA/SDLC protocol or to a 6580 Displaywriter operating under BSC.

Integrated Modem Interface (#5501, #5508, #5510): Provides for an integrated modem to be installed within the 6670 to allow operation at 1200 bps or 600 bps (half-speed operation). Specify #5501 for Integrated Modem, switched line with automatic answer or, #5508 for Integrated Modem, nonswitched line and switched line backup with automatic answer or, #5510 for Integrated Modem, nonswitched line. Field Installation: An MES must be submitted through IBM.

External Modem Interface (#9420, #9421): Provides the ability to attach the 6670 to an external modem. This feature is RS-232-C/CCITT V.24 interface. There are two cable specify codes: #9420 for a 6.1m (20 ft.) cable or #9421 for a 12.2m (40 ft.) cable. Field Installation: An MES must be submitted through IBM.

Digital Data Service Adapter (DDSA) (#9422, #9423): Provides the ability to attach the 6670 (all mdls) to the AT&T Dataphone (R) digital service non-switched network for operation at speeds of 2400 bps or 4800 bps. There are two cable specify codes: #9422 for a 6.1m (20 ft.) cable or #9423 for a 12.2m (40 ft.) cable. Field Installation: An MES must be submitted through IBM.

NON-COMMUNICATIONS FEATURES

Fonts - Optional Hardware Type Styles: Four type styles can be selected and installed as a standard feature. Two additional type styles can be selected and installed in another pair of hardware fonts with the Optional Type Style Feature. Any of the pairs of the US and World Trade type styles shown in the "Group I Fonts" in the "Specify" section above may be ordered for either a US or a World Trade 6670. Use the Feature Code numbers shown with the requested pairing to order the Optional Type Style.

Installation of new type styles in machines with existing font storage features -- re-order the Font Storage Microcode feature (#8401) and indicate the desired type style changes. The Customer Service Representative (CSR) will make necessary type style changes; The normal charge for type style changes within the Font Storage feature applies. Marketing support for the 6670 is handled by the Dallas Support Center and through EQUAL.

Group II Fonts (#3456-#3483, #8362-#8393, #8400-#8401): All mdls of the 6670 may support with the proper prerequisite features in-

stalled (see below), an additional one or two software fonts. These Group II fonts are an Option and take the place of the Optional Group I font pair. Any Group I font may be ordered as a Group II font. Prerequisites: #8400: Provides the memory for the software fonts; Font Storage Microcode (#8401): Provides one or more media which contain the requested Group II fonts. Field installation: Yes.

Group II Type Styles:

Type	Style	Code	Type	Style	Code
Orator		#3456	Courier 12	Extended	
Orator Bold		#3457	UK		#3481
US Prestige		#3458	Courier 10	Extended	
Elite Bold		#3459	Belgian		#3482
US Prestige		#3459	Courier 12	Extended	
Elite Italic		#3460	Belgian		#3483
W.T. Prestige		#3460	APL Extended		#8362
Elite Bold		#3461	Courier 10	Extended	#8363
W.T. Prestige		#3461	Courier 12	Extended	#8364
Elite Italic		#3461	Courier 10	Overstrike/	
6670 Symbol		#3463	Hyphen		#8365
10 Pitch		#3463	US Essay		#8366
OS/6 Symbol		#3464	Standard		#8366
Data 1 Extended		#3465	US Essay		#8367
Data 1 Extended		#3465	Italic		#8367
Bold		#3466	US Courier	72	#8368
Data 1 Extended		#3466	US Prestige		#8369
Italic		#3467	Elite		#8370
Courier 10 Extended		#3467	US Data 1		#8371
German		#3468	6670 Symbol	12 Pitch	#8372
Courier 12 Extended		#3469	US Prestige		#8373
German		#3469	Pica		#8374
Courier 10 Extended		#3470	US Letter		#8375
Swiss		#3471	Gothic		#8376
Courier 12 Extended		#3471	US Essay		#8377
Swiss		#3471	Bold		#8378
Courier 10 Extended		#3472	W.T. Essay		#8379
Dutch		#3473	Standard		#8379
Courier 12 Extended		#3473	W.T. Essay		#8379
Dutch		#3473	Italic		#8379
Courier 10 Extended		#3474	W.T. Prestige		#8379
French		#3474	Elite		#8379
Courier 12 Extended		#3475	W.T. Data 1		#8379
French		#3475	W.T. Letter		#8379
Courier 10 Extended		#3476	Gothic		#8379
Italian		#3476	W.T. Essay		#8381
Courier 12 Extended		#3476	Bold		#8381
		#3476	Courier 10	with Elongated	
		#3476	Hyphen		#8382
		#3476	Overstrike		#8382
		#3476	Essay Light		#8383
		#3476	with Elongated		#8383
		#3476	Hyphen		#8384
		#3476	Overstrike		#8384
		#3476	Document		#8385
		#3476	Letter		#8385
		#3476	Gothic Bold		#8386
		#3476	Boldface		#8387
		#3476	Boldface		#8387
		#3476	Italic		#8388
		#3476	Essay Light		#8388
		#3476	Extended		#8389
		#3476	Document		#8389

MACHINES

Italian	#3477	Extended Letter	#8390
		Gothic Bold	
Courier 10	Extended	Extended	#8391
Nordic	#3478	Boldface	
		Extended	#8392
Courier 12	Extended	Boldface Italic	
Nordic	#3479	Extended	#8393
Courier 10	Extended		
UK	#3480		

Field Installation: An MES must be submitted through IBM.

Font Library - Group III Fonts: These fonts are supported only by mdl 002 (which support the host download capability). These fonts are provided on various media for loading on a variety of host operating systems. The following Group II fonts are provided along with the Group III fonts (listed below) when the appropriate font library medium is ordered. Prerequisites: #8400, #8401. See above.

Group II Fonts Included in the Font Library:

APL Extended	Courier 10 O/S Hyph
Boldface	Data 1 Extended
Boldface Italic	Data 1 Ext. Bold
Courier:	
10 Ext.	Data 1 Ext. Italic
12 Ext.	Document
10 Ext. Belgian	Essay Lt.
	w/Elong. Hyph.
12 Ext. Belgian	Overstrike
10 Ext. French	Letter Gothic Bold
12 Ext. French	Orator
10 Ext. German	Orator Bold
12 Ext. German	Symbol (OS/6)
10 Ext. Italian	US Courier 72
12 Ext. Italian	US Data 1 Rotated
10 Ext. Netherlands	US Essay Bold
12 Ext. Netherlands	US Essay Italic
10 Ext. Nordic	US Essay Standard
12 Ext. Nordic	US Letter Gothic
10 Ext. Swiss	US Prstge Elite
12 Ext. Swiss	US Prstge E. Bold
10 Ext. UK	US Prstge E. Italic
12 Ext. UK	US Prestige Pica
10 w/Elong.	6670 S'bol 10 Pitch
Hyphen Overstrike	6670 S'bol 12 Pitch

Group III Fonts:

APL Rotated, 13.3 p.	Gothic Text Roman
Arabic, 12 pitch	Medium, 12 pitch
Benzene Symbol, 10 p.	Gothic Text Roman
Bookface, 10 pitch	Underscore, 12 p.
CB 12, 12 pitch **	Graph 241, 13.3 p*
Courier Bold, 10 p.	Graph 242, 13.3 p*
Courier Italic, 10 p.	Katakana, 10 pitch
Courier Underscore,	Katakana, 12 pitch
10 pitch	Overstrike, 12 p.
Cyrillic, 10 pitch	Orator Presenter,
	10 pitch
Format (FM 10), 10 p.	Prestige Elite
	Elongated
Format (FM 12), 12 p.	Overstrike, 12 p.
Gothic Text Italic	Serif O/S, 12 p.
Medium, 12 pitch	Serif Text Italic
	Medium, 12 pitch
Gothic Text Roman	Serif Text Roman
	Bold, 12 pitch
Bold, 12 pitch	Serif Text Roman
	Medium, 12 pitch

Note: * Graph 241 and Graph 242 are fonts used in conjunction with Field Developed Program (FDP) #5798-CRB, Business Graphing on the 3800.

** CB12 is a font used in conjunction with Installed User Program (IUP) #5796-PPA, Panel2.

The data stream from these two program offerings must be modified before it is sent to the 6670. There are two alternative methods to do this:

1. The customer can write a program to modify the data stream to include the necessary OCL for font switching and for a user-defined custom keyboard character set; or,
2. The customer can install and use the Field Developed Program (FDP) #5798-DKB, The 6670 Information Distributor Pre-processor, to modify the data stream.

Field Installation: An MES must be submitted through IBM.

Operating Systems Supported for Font Library:

Op'ting System	Program Number	Feature #/Description
OS/VS2 (MVS)	5799-BGK	#9029/9-Trk, 1,600 bpi
VM/370	5799-BGQ	#9031/9-Trk, 6,250 bpi
		#9029/9-Trk, 1,600 bpi
		#9031/9-Trk, 6,250 bpi
DOS/VSE	5799-BGL	#9029/9-Trk, 1,600 bpi
		#9031/9-Trk, 6,250 bpi
S/34	5799-BGN	#9041/Disks, T-1 Format
S/38	5799-BGN	#9041/Disks, T-1 Format
8100	5799-BGN	#9141/Disks, T-1 Format

Field Installation: An MES must be submitted through IBM.

MODEL CONVERSIONS

6670 MES upgrade to model 002 from a model 001. This feature provides the capability of an installed 6670 user to upgrade to a 6670 mdl 002 in order to satisfy the customer's application needs by utilizing the additional features and functions the mdl 002 offers. Order as a model upgrade 001 to 002.

Protocol Conversions: A conversion from BSC to SDLC may be made by ordering new protocol required as an MES. Use the code numbers found in the "Specify" section. The MES is field installable by the Customer Service Representative.

RPQS

External Modem Switch (RPQ 087056): Permits selection between one of two clocking signals; either the 1200 bps signal generated by the 6670, or the signal that is generated by the external modem. This switch is located on the EIA cable, which is 3.7m (12 ft) long for this configuration. Ordered through normal MES procedure using RPQ 087056.

Essay Bold/Essay Italic (ROS Fonts) (RPQ 100027): Provides a ROS font pairing of these two proportional fonts. Ordered through normal MES procedure using RPQ 100027.

Third Party Meter System Interface (RPQ 280002): This feature is available for customers who wish to limit copy usage using meter systems not manufactured by IBM. This connector provides a cable interface that connects the meter system to the 6670. Ordered through normal MES procedure using RPQ 280002.

Front Door Lock (RPQ 773123): This feature provides a front door lock permitting access to the inside of the 6670 only to those people having the key to the lock. Ordered through normal MES procedure using RPQ 773123.

Meter System (RPQ 977047): (Mdls 001, 002) With this feature, the copying function is inhibited until a meter is inserted into a receptacle. This system consists of any number of meters and one meter receptacle. Each meter automatically records the number of copies that are made while it is in the receptacle. (The printing function of the 6670 is not affected by this feature.) Ordered through normal MES procedure using RPQ 977047.

Up-Ending Kit (RPQ 977064): Allows the 6670 to be moved in a 90 degree vertical position. Ordered through normal MES procedure using RPQ 977064.

PROGRAM SUPPORT

Field Developed Programs (FDPs)

1. **6670 Information Distributor Preprocessor (FDP 5798-DKB):** Supports all models of the 6670, bisync or SDLC. Provides an interface between DCF and the 6670 which offers faster processing of output, a simple font switching capability, eliminates device dependencies in source files, handles justification of proportional and mixed-pitch fonts, and provides virtual font capability. For additional information, see Program Description/Operations Manual, SB21-2975.
2. **File Conversion for Word Processors:** This FDP provides the capability of converting data processing data sets to a form that can be printed by the 6670, by performing the following functions: -- inserting OCL at the beginning of the data set -- qualifying records based on the contents of a field -- converting and editing packed decimal, EBCDIC, and binary fields -- converting uppercase fields to a mixture of uppercase and lowercase characters -- substituting data, based on the contents of a field -- deleting trailing blanks in an alphabetic field -- deleting leading zeroes in a numeric field -- and inserting delimiters, such as switch codes, between fields. For additional information, see 5798-DFY, and its Program Description/Operations Manual, SB21-2882.
3. **IBM Manyfont:** Users who format data containing many type style changes, especially those documents with equations, may want to make use of this Installed User Program. Manyfont extends the capabilities of SCRIPT/VS in two ways: -- it provides a simple means to change the font for a single character -- and it supports a wide variety of output devices for text that have many type styles. For additional information, see 5796-PPE, and its Program Description/Operations Manual, SH20-2607.
4. **Panel2:** This Installed User Program is a line art program that is used to develop flowcharts, HIPO charts, foils, and simple drawings. Prerequisites: This IUP requires the use of the 6670 font, CB12, which is available as a Group III font in the 6670 Font Library option. For additional information, see PANEL2 Users Guide - 5796-PPA.
5. **Business Graphing On The IBM 3800:** This Field Developed Program provides the capability to use 6670 to print a variety of graphs, e.g., bar charts, histograms. Prerequisites: This

program requires the use of the 6670 fonts Graph 241 and Graph 242, which are available as Group III fonts in the 6670 Font Library option.

6. **Font Editing System:** This Field Developed Program provides the capability to create and/or edit fonts for the 6670. For additional information, see Program Description/Operations Manual (SB11-5744) and 5785-FAW.
7. **S/38 Office/38 Text Management Licensed Program:** This licensed program provides the capability for S/38 users to create, store, retrieve, revise and print documents. The 6670 is supported as an output device with the following formatting options able to be specified: headers and footers on a page, number of copies, page length, line numbering, flagging changes, and font downloading (mdl 002 only). For additional information, see 5714-WP2, and Getting Started with System/38 Office/38 - Text Management.
8. **S/36 Text Management System Licensed Program:** This program provides the user with a library of programs that provide document creation, revision, viewing, merging, with user data files, spelling aids, and printing functions. The 6670 is supported as an output device. For additional information, see 5727-TX1, and Text/Office Brochure, G580-0454.

SUPPLIES

IBM High-Yield Toner: Reorder P/N 1669081.

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, contact IBM.

Starter Pac (#5878): Each Pac contains 25 blue writable-area mag cards and two cartridges of High-Yield Toner.

ACCESSORIES

Cables: IBM shielded twisted-pair cable (or equivalent) or twinaxial cable is required for attachment to a 5525 using the LDC attachment feature. All cable-thru devices on a single cable must use the same cable type. Cable and associated accessories may be purchased from IBM or a customer-selected source. The customer is responsible for installation and maintenance of the cable and associated accessories.

Twisted-Pair Cable: For proper identification, installation and application of cable and associated accessories, refer to IBM Cabling System - Planning and Installation Guide, GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country.

Twinaxial Cable: For proper identification, installation and application of cable and associated accessories, refer to IBM 5520 Administrative System Installation Manual - Physical Planning, GA23-1011. When cable is ordered from IBM, specify a shipping date at least four weeks in advance of receiving the machine.



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MACHINES

M 6700.1
Feb 85

6700 SELECTRIC III TYPEWRITER

[NO LONGER AVAILABLE]

PURPOSE

The 6700 Selectric III Typewriter is a single pitch correcting typewriter, with a 343mm (13.5 in) paper capacity.

MODELS

Model A01

Dimensions:

Width: 470mm (18.5 in.)
Depth: 396mm (15.6 in.)
Height: 178mm (7.0 in.)
Weight: 16kg (36 lbs.)

HIGHLIGHTS

- Ribbon cassette mechanism resulting in high character yield per ribbon.
- The following features are standard:
Voltage: For Canada and Ecuador -- 115V, 60 Hz (#E001); for Australia -- 240V, 50 Hz, (#E023); for New Zealand -- 220V, 50 Hz (#E028).

Line-Cord: For Canada and Ecuador -- 2 wire, insulated; for Australia and New Zealand -- 3-wire, grounded.

Keyboard: For Australia and New Zealand -- 96 character US Correspondence with US English keybutton engraving (#K443); for Ecuador -- 96 character Latin American Symbolized keyboard with Spanish keybutton engraving (#K460); for Canada -- See "Specify" below.

Pitch: For Australia and New Zealand -- 10 Pitch; for Canada and Ecuador -- 12 pitch.

Paper Feed: All countries (1, 1.5, 2) 54-Tooth Ratchet.

Color: For Australia -- Laurel Green with Black Bottom Cover; for Canada, Ecuador and New Zealand -- Topaz Bronze with Black Bottom Cover.

SPECIFY

- Element: Specify one of appropriate pitch element.
- (Canada only -)
- Keyboards (96 characters): Specify #K447 for bilingual or K448 for English keybutton engraving.

SPECIAL FEATURES (None)

MODEL CONVERSIONS (None)

ACCESSORIES (None)

SUPPLIES

Each 6700 shipment to the customer will include the following: One IBM #210 Correctable Ribbon Cassette (Black), one Lift-Off Tape, a choice of appropriate Pitch Element.

The following supply items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5863): Each Starter Pac contains six Correctable Ribbon Cassettes (No. 210) and six Lift-off Tapes.

Supply Kit (#5864): Each Supply Kit contains 12 Correctable Ribbon Cassettes (No. 210) and 18 Lift-off Tapes.

6701 SELECTRIC III TYPEWRITER
PURPOSE

The 6701 Selectric III Typewriter is a single pitch, non-correcting fabric ribbon typewriter, with a 343mm (13.5 in) paper capacity.

MODELS
Model 001
Model L2 and Model R12
Dimensions:

Width: 470mm (18.5 in.)
Depth: 396mm (15.6 in.)
Height: 178mm (7.0 in.)
Weight: 16kg (36 lbs.)

HIGHLIGHTS

- Fabric Ribbon mechanism resulting in high character yield per ribbon.
- The following features are standard:
Voltage: For Canada and Ecuador -- 115V, 60 Hz (#E001); for Australia -- 240V, 50 Hz (#E023); for New Zealand -- 220V, 50 Hz (#E028).
Line-cord: For Canada, and Ecuador -- 2-wire, double insulated; for Australia and New Zealand -- 3-wire, grounded.
Keyboard: For Australia and New Zealand -- 96 character US Correspondence with US English keybutton engraving (#K443); for Ecuador -- 96-character Latin American Symbolized keyboard with Spanish keybutton engraving (#K460); for Canada -- see "Specify" below.
Paper Feed: (1, 1.5, 2): 54-Tooth Ratchet.
Pitch: For Australia and New Zealand -- 10 pitch; for Ecuador -- 12 pitch; for Canada -- see "Specify" below.
Color: For Canada -- Raven Black with Black Bottom Cover; for Ecuador and New Zealand -- Topaz Bronze with Black Bottom Cover; for Australia -- Laurel Green with Black Bottom Cover.

SPECIFY

(Canada only+)

- Pitch: Specify 10 (not available after December, 1984) or 12-pitch.
- Element: For 12-pitch machine specify Prestige Elite lock-on (Model L12) or Prestige Elite removable (Model R12). +)

(Canada only+)

- Keyboard: 96 characters, specify #K447 for bilingual or #K448 for English keybutton engraving. +)
- Element: Specify appropriate pitch element.

MODEL CONVERSIONS (None)
ACCESSORIES (None)
SUPPLIES

Each 6701 shipment to the customer will include the following: One Fabric Ribbon Cartridge, a choice of appropriate Pitch Element.



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M 6704.1

Feb 85

6704 SELECTRIC III TYPEWRITER

[Subject to availability after October 16, 1984.]

PURPOSE

The 6704 Selectric III Typewriter is a dual-pitch, correcting typewriter, with a 343mm (13.5 in) paper capacity.

MODELS

Model A01

Dimensions:

Width: 470mm (18.5 in.)

Depth: 396mm (15.6 in.)

Height: 178mm (7.0 in.)

Weight: 16kg (36 lbs.)

HIGHLIGHTS

- The 6704 utilizes the Ribbon Cassette System, resulting in high character yield per ribbon.
- The following features are standard:
 - Line-cord:** 2-wire, double insulated.
 - Keyboard:** For Japan -- (K458) with Japanese English keybutton engraving.
 - Paper Feed:** (1, 1.5, 2): 54-Tooth Ratchet.
 - Pitch:** Dual pitch (10 and 12).
 - Color:** Pebble Gray.

SPECIFY

- Power:

50 Hz	60 Hz
100V #E018	100V #E020
- Element: Choice of 10 and 12-pitch element.

SPECIAL FEATURES (None)

MODEL CONVERSIONS (None)

ACCESSORIES (None)

SUPPLIES

Contact IBM.

MACHINES
6705 SELECTRIC III TYPEWRITER
PURPOSE

The 6705 Selectric III Typewriter is a dual-pitch, correcting typewriter, with a 394mm (15.5 in.) paper capacity.

MODELS

Model 001 (Subject to availability after December 31, 1983.)

Model A01 (Subject to availability after October 16, 1984.)

Dimensions:

Width: 521mm (20.5 in.)
Depth: 396mm (15.6 in.)
Height: 178mm (7.0 in.)
Weight: 17kg (39 lbs.)

HIGHLIGHTS

- The 6705 utilizes the Ribbon Cassette Mechanism resulting in high character yield per ribbon except for mdl 001 which utilizes the Selective Ribbon Mechanism.
- **Lighted Margin Scale:** For all mdls except B01.
- The following features are standard:
 - **Voltage:** For Barbados and Jamaica -- 122.5V, 50 Hz (#E034); for Australia and Guyana -- 240V, 50 Hz (#E023); for Argentina, Bolivia, Chile, Honduras, Hong Kong, Indonesia, Malaysia, New Zealand, Paraguay, Singapore, Sri Lanka, and Uruguay -- 220V, 50 Hz (#E028); for Mexico -- 130V, 60 Hz (#E022); for Philippines and Peru -- 220V, 60 Hz (#E017); for Japan -- see "Specify" below; for all other countries -- 115V, 60 Hz (#E001).
 - **Line-Cord:** For Australia, Hong Kong, New Zealand, and Sri Lanka, -- 3-wire grounded; for Malaysia and Singapore -- 3-wire grounded, fused; for all other countries -- 2-wire double insulated.
 - **Keyboard:** For Antigua, Barbados, and Sri Lanka -- #K473 with UK English keybutton engraving; for Australia and New Zealand -- #K443 with English keybutton engraving; for Bahamas, Bermuda, Guyana, Hong Kong, Indonesia, Jamaica, South Korea, Surinam, Taiwan, Trinidad -- #K444 with English keybutton engraving; for Brazil -- #K445 with Spanish keybutton engraving; for Cayman Islands and Haiti -- #K448 with English keybutton engraving; for Japan -- #K458 with English keybutton engraving; for Antilles, Canada, Malaysia, Netherlands, and Singapore -- see "Specify" below; for all other Latin American countries -- #K460 96-character Latin American Symbolized keyboard with Spanish keybutton engraving.
 - **Paper Feed** (1, 1.5, 2): For all countries -- 54-Tooth Ratchet.
 - **Pitch:** Dual pitch (10 and 12).
 - **Color:** For Antigua, Barbados, Bermuda, Cayman Islands and Haiti -- Black; for Sri Lanka -- Pebble Gray; for Colombia -- Laurel Green; for other countries, see "Specify" below.

SPECIFY

(Japan only+)

- **Power:**

50 Hz	60 Hz
100V #E018	100V #E020 +)
- **Keyboard 96-Character:**

Country	Keybutton Engraving	Code
Canada	French	#K447
Canada	English	#K448
Malaysia, Singapore	English	#K444

Elements: Choice of two elements.

- **Color:** For Argentina, Brazil, Dominican Republic, Paraguay, Uruguay -- Marlin Blue or Topaz Bronze; for Australia -- Laurel Green or Marlin Blue; for Bolivia -- Marlin Blue, Pebble Gray or Topaz Bronze; for Canada, Ecuador -- Raven Black, or Topaz Bronze; for New Zealand -- Laurel Green or Topaz Bronze; for all other countries -- Marlin Blue or Pebble Gray.

SPECIAL FEATURES (None)
MODEL CONVERSIONS (None)
ACCESSORIES (None)
SUPPLIES

Each 6705 shipment to the customer will include the following:

- For mdl 001 -- One Selective Ribbon Cartridge (black), one lift-off

tape, and choice of two elements.

- For mdl A01 -- One Ribbon Cassette (black), one lift-off tape, and choice of two elements.

The following supply items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5863): Each Starter Pac contains six Correctable Ribbon Cassettes (No. 210) and nine Lift-off Tapes.

Supply Kit (#5864): Each Supply Kit contains 12 Correctable Ribbon Cassettes (No. 210) and 18 Lift-off Tapes.

6713 ELECTRONIC TYPEWRITER 50/60/75

(Orders accepted on "as available" basis only)

PURPOSE

The 6713 Electronic Typewriter Models 50, 60, and 75 combine single-element (but interchangeable element) typing technology, correction capability, and electronic text management with a 393.7mm (15.5 in.) paper capacity.

MODELS

Model A50: Standard 50

Model K50: Custom 50

Model A60: Standard 60, 736-character memory

Model K60: Custom 60, 736-character memory

Model A75: Standard 75, 15,500-character memory

Model K75: Custom 75, 15,500-character memory

Dimensions:

Width: 536.0mm (21.1 in.) Depth: 447.0mm (17.6 in.) Height: 165.1mm (6.5 in.) Weight: 22.7kg (50 lbs.)

HIGHLIGHTS

- Model 75 has a standard 15,500-character storage capacity to be shared by document and phrase storage.
- Document storage allows the typist to temporarily store documents for later revision, thus eliminating much retyping.
- Phrase storage allows phrases, sentences, paragraphs and documents to be stored and played out error free. 99 storage areas are available to store up to 15,500 characters.
- Proportional spacing in addition to 10 and 12 pitch.
- Format storage.
- Electronic column layout.
- Ribbon cassette system.

SPECIFY

- Power (double insulated unless otherwise specified):

50 Hz	60 Hz
100V #E018	100V #E020
110V #E027	115V (Canada) #E025
112.5V #E034	115V (Canada) #E085*
115V #E090	115V #E087
127V #E021	123.5V #E022
200V #E014	127V #E010
200V #E091*	220V #E003

220V #E092	230V #E089
220V #E006*	
230V #E095*	
230V #E096	
240V #E023*	

* Grounded.

- Keyboard Group:

Canada - Bilingual #K447
 Canada - English #K448
 Australia/New Zealand #K443
 Japan English #K458
 Japan Katakana/Japan English #K580 *
 Latin America #K460
 South Africa #K467

* Secondary language (dual language) is standard. Keyboard available for Model 50 only.

- Color: Specify #C055 for Autumn Red, #C052 for Cocoa Brown, #C054 for Laurel Green, #C053 for Marlin Blue, #C043 for Pebble Gray, #C030 for Raven Black, #C051 for Sable Brown, #C038 for Sandstone Beige, and #C034 for Topaz Bronze.

- Paper Feeds:

(1,2,3) Models A50/K50/A60/K60:

46-Tooth #0087
 51-Tooth #0089
 54-Tooth #0100

(1,1.5,2,3) Models A75/K75:

46-Tooth #0120
 51-Tooth #0122
 54-Tooth #0123

SPECIAL FEATURES

(NO LONGER AVAILABLE)

Memory Protection (#5931): (Model A75, K75) Provides battery backup with approximately 25 minutes protection against power failure. Field Installation: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

The following supply items may be ordered with the initial machine shipment. For pricing and additional supply information, see your Country DP Supplies Coordinator.

Supply Kit (#5898): Each Supply Kit contains 12 Correctable Ribbon Cassettes and 6 Lift-off Tapes.

6714 - ELECTRONIC TYPEWRITER

NO LONGER AVAILABLE AS OF DECEMBER 17, 1985

SPECIFY

PURPOSE

The 6714 Electronic Typewriters 65, 85 and 95 are phrase/document typewriters with 393.7mm (15.5 inch) paper capacity.

MODELS B65, K65, B85, K85, B95, K95

Model B65: Standard 65, 7,400 character memory.

Model K65: Custom 65, 7,400 character memory.

Model B85: Standard 85, 15,500 character memory.

Model K85: Custom 85, 15,500 character memory.

Model B95: Standard 95, 31,500 character memory.

Model K95: Custom 95, 31,500 character memory.

Dimensions:

Width: 549.4mm (21.6 in.)
Depth: 453.2mm (17.8 in.)
Height: 177.8mm (7.0 in.)
Weight: 21.6kg (47.5 lbs.)

HIGHLIGHTS

- Mdl's B65 and K65 contain 7,400 characters of memory, and mdl's B85 and K85 contain 15,500 characters of memory which can be stored in 26 alpha and 99 numeric positions on the keyboard.
- Proportional spacing in addition to 10 and 12 pitch.
- Right margin justification on payout in any pitch.
- Electronic keyboard.
- Resident diagnostics.
- Mdl's B95 and K95 contains 31,500 characters of memory which can be stored in 26 alpha and 99 numeric positions on the keyboard.
- Mdl's B95 and K95 memory is protected for approximately 6 months as a standard feature.
- Mdl's B85 and K85 memory is protected for approximately 12 months as a standard feature.
- Field upgradable for protected memory or expanded-protected memory (see "Model Conversions" below).
- Mdl's B85, K85, B95 and K95 may be upgraded to include removable storage capability by installing Typewriter Modularity Option (#8560) and connecting a 6731 Typewriter Diskette Module. (See M6731 pages)
- Communications:
(Canada only) The 6714 mdl's B85, K85, B95 and K95 may be upgraded to include asynchronous communication capability by installing the Typewriter Modularity Option (#8560) and connecting the 6714 to a 6733 Typewriter Communication Module. See M6733 page for details.<)

Power (AC, 2-wire):

Voltage		50 Hz	60 Hz
100V	Japan		#E020
100V		#E027	
110V		#E018	
112.5V	Barbados, Bolivia, Cayman Island	#E034 #E090	
115V			#E025
120V	Canada Bermuda, Costa Rica, Dominican Republic, Honduras, Taiwan, Surinam, Panama, Guatemala, Korea, Trinidad		#E087
120V		#E014	
200V			
220V	Argentina, Chile, Indonesia, Hong Kong, Thailand, Uruguay	#E093	
220V	Peru, Philippines		#E003
230V	Malaysia, New Zealand, Singapore	#E096	#E089
230V			
240V	Australia	#E023	

Paper Feeds (1, 1.5, 2, 3):

46-Tooth #0120
51-Tooth #0122
54-Tooth #0123

Keyboards (96 characters unless otherwise specified):

	Keybutton Engraving	Code
Canada	English/French	#K447
Canada	English	#K448
France	French	#K452
Germany	German	#K453
Italy	Italian	#K457
Japan	English	#K458
Latin American Abbreviated	Spanish	#K110
Latin America Symbolized	Spanish	#K460
South Africa	English	#K467
United Kingdom	English	#K473

Elements: Choice of two elements.

Color: #C043 (pebble gray) is standard.

SPECIAL FEATURES

NON-COMMUNICATIONS FEATURES

Memory Protection (#5931): (Field install only after December, 1984.) (Mdl K65) Provides battery backup with approximately 25 minutes protection after power failure. Field Installation: Yes. (All mdl's 65 and 85 without extended memory protection).

Typewriter Modularity Option (#8560): (Field install only after December, 1984.) (Mdl B85, K85, B95 and K95). Required in order to attach the the 6731 Typewriter Diskette Module to the typewriter. Field Installation: Yes.

COMMUNICATIONS FEATURES

(Canada only > Typewriter Modularity Option (#8560): (Field install only after December, 1984.) (All mdls 85 and 95) (Mdls B85, K85): Provides the interface between the 6714 and the 6733 Typewriter Communication Module. Field Installation: (Mdl K85) Yes (MES 1305501). Mdl B85 field installable only. <)

MODEL CONVERSIONS

Field upgradable from model 65 to 85, specify #8520, (not available after February 17, 1984). Upgrading includes an additional 8,000 characters of memory, return and advance keybuttons, semi-automatic paper insert lever and lighted carrier position indicator.

- Mdl 65 to 85. Specify #8531 for US Correspondence Keyboard; specify #8536 for Latin American Keyboard. Upgrading includes an additional 8,000 characters of 12 month protected memory, return and advanced keybuttons, semi-automatic paper insert lever and lighted carrier position indicator.
- Mdl 85 to 85 (12 month protected memory). Specify #8532 for US Correspondence Keyboard; specify #8537 for Latin American Keyboard. Upgrading provides 12 month protection on the 15,500 character memory.
- Mdl 85 with 12 month protected memory to mdl 95. Specify #8533 for US Correspondence Keyboard; specify #8533 for Latin American Keyboard. Upgrading provides an additional 16,000 character memory. The total of 31,500 characters of memory is protected for six months.
- Mdl 65 to 95. Specify #8534 for US Correspondence Keyboard; specify #8538 for Latin American Keyboard. Upgrading includes an additional 24,000 characters of 6 month protected memory, return and advanced keybuttons, semi-automatic paper insert lever and lighted carrier position indicator.

- Mdl 85 to 95. Specify #8535 for US Correspondence Keyboard; specify #8539 for Latin American Keyboard. Upgrading provides an additional 16,000 characters of 6 month protected memory.

Note: Field upgrades require the removal of certain parts which be comes the property of IBM. Order through normal MES procedure.

ACCESSORIES (NONE)

SUPPLIES

Each 6714 shipment to the customer will include the following: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, and two specified elements.

Each 6714 shipment to the customer will include the following:

- Mdl B65: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, one Title Element (P/N 1352902), and one Prestige Elite Element, (P/N 1352003).
- Mdl K65: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, and the two specified elements.
- Mdl B85 and B95: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, three memory protection batteries, one Title Element (P/N 1352902), and one Prestige Elite Element.
- Mdl K85 and K95: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, three memory protection batteries, and the two specified elements.

The following supply items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Supply Kit (#5898): Each Supply Kit contains 12 Correctable Ribbon Cassettes and six Lift-off Tapes.

6715 ACTIONWRITER 1 TYPEWRITER

PURPOSE

The 6715 ActionWriter(R) 1 Typewriter is a triple pitch, general purpose compact electronic typewriter incorporating a number of advanced functions. It is well suited for classroom, home, student, and light to medium business use.

Note: IBM plans to make available the optional capability to attach the IBM ActionWriter Typewriter to selected IBM personal computer products. This feature will be similar in function to the printer option available on IBM WheelWriter Typewriters. Availability will be subject to FCC certification.

MODELS

Name: IBM 6715 Typewriter (except Canadian/English is IBM ActionWriter 1 Typewriter and Canadian/French is La machine a ecrire Initia IBM).

Customer Setup (CSU): Yes. For additional information on CSU, refer to GI section.

HIGHLIGHTS

- Two-line automatic correction
- Semi-automatic paper insertion
- Decimal tabulation
- Keyboard paper movement control
- Paragraph indent
- One-half backspace
- Automatic underscore
- Relocate
- Alternate Keyboard (US Keyboard only)
- 10, 12 and 15 pitch
- 13 characters and spaces per second print speed per line
- Compact Printwheels (100-character)
- Four line-space settings - 1, 1-1/2, 2, and 3
- Page end indicator
- Cassette ribbons and spool correction tapes
- Flush right
- Automatic centering
- Impression selection - light, medium, and heavy

Dimensions:

Width - 483mm (19.0 in.)
 Depth - 381mm (15.0 in.)
 Height - 142mm (5.6 in.)

Weight:

Typewriter Only - 10.8kg (24.0 lbs.)
 Typewriter and Packaging - 13.5kg (30.0 lbs.)
 Paper Capacity - 336mm (13.25 in.)
 Writing Line - 279mm (11.0 in.)

SPECIFY

- Line cord: 3-wire grounded cord set 2.04m (6.8 ft)
- Paper feed: 1, 1-1/2, 2 and 3
 - 6 lines per inch (25.4mm) in all pitches
- Pitch: Triple (10, 12 and 15)
- Printwheel: Prestige Elite Except: Canada English, Canada Bilingual shipped with Courier 10
- Dust Cover: Translucent.

- Color: Shell Gray with Graphite Gray base and Pearl White keybuttons.

- The following are standard features:

- Voltage: For Indonesia, Thailand, Chile, Paraguay, Uruguay, Argentina, Sri Lanka and Hong Kong -- 200V/50 Hz; New Zealand and Singapore -- 230V/50 Hz; Australia and Malaysia -- 240V/50 Hz; Bolivia, Peru and the Philippines -- 220V/60 Hz; the Bahamas, Guyana, Surinam, Taiwan, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Nicaragua, Panama, and the Netherland Antilles -- 110V/60 Hz; Jamaica -- 110V/50 Hz; Antigua -- 110V/60 Hz; Japan -- 110V/50-60 Hz; Barbados -- 115V/50 Hz; Bermuda, Korea, Columbia, Venezuela, the Cayman Isles and Trinidad -- 115V/60 Hz; Canada -- 120V/60 Hz.

- Keyboard (96-character - 100-character yield): The following standard keyboards are listed by country, part number, keyboard language/code number, language of operator publications and country group number.

- ▲ Antigua, Bahamas, Barbados, Bermuda, Cayman Isles, Guyana, Jamaica, Korea, Netherland-Antilles, Taiwan, Trinidad:

Part Number: 1180000
 Primary Keyboard/Code Number: US English/001A
 Pubs.: WT English
 Country Group Number: 23

- ▲ Argentina:

Part Number: 1180001
 Primary Keyboard/Code Number: Latin American/025A
 Pubs.: Spanish
 Country Group Number: 24

- ▲ Australia:

Part Number: 1180002
 Primary Keyboard/Code Number: US English/001A
 Pubs.: US English
 Country Group Number: 23

- ▲ Bolivia, Ecuador, Venezuela:

Part Number: 1180006
 Primary Keyboard/Code Number: Latin American/025A
 Pubs.: Spanish
 Country Group Number: 24

- ▲ Canada-English:

Part Number: 1180007
 Primary Keyboard/Code Number: Canadian English/037A
 Pubs.: Canadian English
 Country Group Number: 23

- ▲ Canada-French:

Part Number: 1180008
 Primary Keyboard/Code Number: Canadian Bilingual/039/A
 Pubs.: Canadian French
 Country Group Number: 09

- ▲ Chile:

Part Number: 1180009
 Primary Keyboard/Code Number: Latin American/025A
 Pubs.: Spanish

Country Group Number: 24

- ▲ Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Panama:

Part Number: 1180010
Primary Keyboard/Code Number: Latin American/025A
Pubs.: Spanish
Country Group Number: 24

- ▲ Hong Kong:

Part Number: 1180014
Primary Keyboard/Code Number: Hong Kong/119A
Pubs.: UK English
Country Group Number: 02

- ▲ Indonesia:

Part Number: 1180015
Primary Keyboard/Code Number: US English/001A
Pubs.: WT English
Country Group Number: 23

- ▲ Japan:

Part Number: 1180017
Primary Keyboard/Code Number: Japanese English/069A
Pubs.: Japanese
Country Group Number: 02

- ▲ Malaysia, Singapore, Sri Lanka:

Part Number: 1180018
Primary Keyboard/Code Number: UK English/067A
Pubs.: UK English
Country Group Number: 02

- ▲ New Zealand:

Part Number: 1180002
Primary Keyboard/Code Number: US English/001A
Pubs.: WT English
Country Group Number: 23

- ▲ Paraguay, Uruguay:

Part Number: 1180021
Primary Keyboard/Code Number: Latin American/025A
Pubs.: Spanish
Country Group Number: 24

- ▲ Peru, Philippines:

Part Number: 1180022
Primary Keyboard/Code Number: Latin American/025A
Pubs.: Spanish
Country Group Number: 24

- ▲ Thailand:

Part Number: 1180028
Primary Keyboard/Code Number: US English/001A
Pubs.: WT English
Country Group Number: 23

- Printwheels: The following is a listing of the IBM Compact Printwheel reorder numbers available for the 6715. The typesstyles though similar in size and style are not exact matches to current IBM elements, printwheels and electronic fonts.

10 PITCH:

- Country Group Number 2*:

Country Keyboards: Hong Kong, Japan, Malaysia, Singapore, Sri Lanka
Courier 10: 1361526
Presenter: 1361527
Symbol: 1361500

- Country Group Number 9*:

Country Keyboards: Canada (Bilingual)
Courier 10: 1361508
Symbol: 1361500

- Country Group Number 23*:

Country Keyboards: Antigua, Australia, Bahamas, Barbados, Bermuda, Canada (English), Cayman Isles, Guyana, Indonesia, Jamaica, Korea, Netherland-Antilles, New Zealand, Thailand, Trinidad
Courier 10: 1361504
Presenter: 1361505
Symbol: 1361500

- Country Group Number 24*:

Country Keyboards: Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Philippines, Uruguay, Venezuela
Courier 10: 1361504
Symbol: 1361500

* The Country Group Number identifies a given set of characters and their printwheel petal positions. The printwheels listed for each Country Group Number will support the Country Group Keyboards shown.

12 PITCH:

- Country Group Number 2*:

Country Keyboards: Hong Kong, Japan, Singapore, Sri Lanka
Letter Gothic**: 1361524
Prestige Elite**: 1361523
Script: 1361525

- Country Group Number 9*:

Country Keyboards: Canada (Bilingual)
Letter Gothic**: 1361507

- Country Group Number 23*:

Country Keyboards: Antigua, Australia, Bahamas, Barbados, Canada (English), Cayman Isles, Guyana, Indonesia, Jamaica, Korea, Netherland-Antilles, New Zealand, Saudi Arabia, Taiwan, Thailand, Trinidad
Letter Gothic**: 1361502
Prestige Elite**: 1361501
Script: 1361503

- Country Group Number 24*:

Country Keyboards: Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Ecuador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Philippines, Uruguay, Venezuela
Letter Gothic**: 1361502
Prestige Elite**: 1361501
Script: 1361532 (future availability)

* The Country Group Number identifies a given set of characters and their printwheel petal positions. The printwheels listed for each Country Group Number will support the Country Group Keyboards shown.

** The printwheels are marked 12/10 and may be used in 12 or 10 pitch.

15 PITCH:

- Country Group Number 2*:

Country Keyboards: Hong Kong, Japan, Malaysia,
Singapore, Sri Lanka
Micro 15: 1361528

- Country Group Number 9*:

Country Keyboards: Canada (Bilingual)
Micro 15: 1361509

- Country Group Number 23*:

Country Keyboards: Antigua, Australia, Bahamas,
Barbados, Bermuda, Canada (English), Cayman
Isles, Guyana, Indonesia, Jamaica, Korea,
Netherland-Antilles, New Zealand, Taiwan,
Thailand, Trinidad
Micro 15: 1361506

- Country Group Number 24*:

Country Keyboards: Argentina, Bolivia, Chile,
Colombia, Costa Rica, Dominican Republic, El

Salvador, Ecuador, Guatemala, Honduras,
Nicaragua, Panama, Paraguay, Peru, Philippines,
Uruguay, Venezuela
Micro 15: 1361533 (future availability)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Dust Cover (P/N 1222377): Included with the typewriter.

Carrying Case (#5956, P/N 1361550).

SUPPLIES

Basic supplies come with the machine. If Starter Pacs are requested, the order must be entered with the machine order.

Starter Pac - IBM ActionWriter 1 Typewriter (#5957, P/N 1361549)

6723 ELECTRONIC TYPEWRITER 50/75

(Orders accepted on "as available" basis only)

PURPOSE

The 6723 Electronic Typewriter Models 50 and 75 combine single-element (but interchangeable element) typing technology, correction capability, and electronic text management with a 485.1mm (19.1 in.) paper capacity.

MODELS

Model A50: Standard 50

Model K50: Custom 50

Model B75: Standard 75, 15,500-character memory

Model K75: Custom 75, 15,500-character memory

Dimensions Models 50/75:

Width: 536.0mm (21.1 in.)
Depth: 447.0mm (17.6 in.)
Height: 165.1mm (6.5 in.)
Weight: 22.7kg (50 lbs.)

HIGHLIGHTS

- Model 75 has a standard 15,500-character storage capacity to be shared by document and phrase storage.
- Document storage allows the typist to temporarily store documents for later revision, thus eliminating much retyping.
- Phrase storage allows phrases, sentences, paragraphs and documents to be stored and played out error free. 99 storage areas are available to store up to 15,500 characters.
- Proportional spacing in addition to 10 and 12 pitch.
- Format storage.
- Electronic column layout.
- Ribbon cassette system.

SPECIFY

- Power (AC, 2-wire, double insulated unless otherwise specified):

50 Hz		60 Hz	
100V	#E018	100V	#E020
110V	#E027	115V (Canada)	#E025
112.5V	#E034	115V (Canada)	#E085 *
115V	#E090	115V	#E087
127V	#E021	123.5V	#E022
200V	#E014	127V	#E010
200V	#E091*	220V	#E003
220V	#E092	230V	#E089

220V	#E006*
230V	#E095*
230V	#E096
240V	#E023*

* Grounded.

- Keyboard Group:

Country	Code
Canada - Bilingual	#K447
Canada - English	#K448
Australia/New Zealand	#K443
Japan English	#K458
Japan Katakana/Japan English	#K580*
Latin America	#K460
South Africa	#K467

* Secondary language (dual language) is standard. Keyboard available for Model 50 only.

- Color: Specify #C055 for Autumn Red, #C052 for Cocoa Brown, #C054 for Laurel Green, #C053 for Marlin Blue, #C043 for Pebble Gray, #C030 for Raven Black, #C051 for Sable Brown, #C038 for Sandstone Beige, and #C034 for Topaz Bronze.

- Paper Feeds:

- (1,2,3) Models A50/K50:

46-Tooth	#0087
51-Tooth	#0089
54-Tooth	#0100

- (1,1.5,2,3) Models B75/K75:

46-Tooth	#0120
51-Tooth	#0122
54-Tooth	#0123

SPECIAL FEATURES

(NO LONGER AVAILABLE)

Memory Protection (#5931): (Model B75, K75) Provides battery backup with approximately 25 minutes protection against power failure. Field Installation: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

The following supply items may be ordered with the initial machine shipment. For pricing and additional supply information, see your Country DP Supplies Coordinator.

Supply Kit (#5898): Each Supply Kit contains 12 Correctable Ribbon Cassettes and 6 Lift-off Tapes.

6724 - ELECTRONIC TYPEWRITER

NO LONGER AVAILABLE AS OF DECEMBER 17, 1985

6733 Typewriter Communication Module. See M6733 page for details.<)

PURPOSE

The 6724 Electronic Typewriters 65, 85 and 95 are phrase/document typewriters with a 485.1mm (19.1 inch) paper capacity.

MODELS

Model B85: Standard 85, 15,500 character memory.

Model B95: Standard 95, 31,500 character memory.

Model K65: Custom 65, 7,400 character memory.

Model K85: Custom 85, 15,500 character memory.

Model K95: Custom 95, 31,500 character memory.

Dimensions

Width: 641.0mm (25.2 in.)
Depth: 453.2mm (17.8 in.)
Height: 177.5mm (7.0 in.)
Weight: 23.6kg (52.0 lbs.)

HIGHLIGHTS

- Mdl's B85 and B95 are standard mdl's with the following specifications:
Color: Pebble Gray
Keyboard: 95-Character US Correspondence
Elements: Prestige Elite and Title
Ratchet: 54-Tooth
Motor: 120V, 60 Hz
- Mdl K65 contains 7,400 characters of memory, and mdl K85 contains 15,500 characters of memory which can be stored in 26 alpha and 99 numeric positions on the keyboard.
- Proportional spacing in addition to 10 and 12 pitch.
- Right margin justification on payout in any pitch.
- Electronic keyboard.
- Mdl K95 contains 31,500 characters of memory which can be stored in 26 alpha and 99 numeric positions on the keyboard.
- Mdl K95 memory is protected for approximately 6 months as a standard feature.
- Mdl K85 memory is protected for 12 months as a standard feature.
- Field upgradable for protected memory or expanded-protected memory (see "Model Conversions" below).
- Mdl's K85 and K95 may be upgraded to include removable storage capability by installing Typewriter Modularity Option (#8560) and connecting a 6731 Typewriter Diskette Module. (See M6731 pages.)
- Resident diagnostics.
- Communications:
(Canada only> Mdl K85 may be upgraded to include asynchronous communication capability by installing the typewriter modularity option and connecting the typewriter to a

SPECIFY

- Power (AC, 2-wire):
Voltage 50Hz 60Hz
100V Japan #E027
100V #E018
110V
112.5V Barbados, Bolivia, #E034
Cayman Islands #E090
115V #E025
120V Canada
120V Bermuda, Costa
Rica, Dominican
Republic, Honduras,
Taiwan, Surinam,
Panama, Guatemala,
Korea, Trinidad #E087
200V #E014
220V Argentina, Chile,
Indonesia, Hong
Kong, Thailand,
Uruguay #E093
220V Peru, Philippines #E003
230V Malaysia, New
Zealand, Singapore #E096
230V #E089
240V Australia #E023
- Paper Feeds (1, 1.5, 2, 3):
46-Tooth #0120
51-Tooth #0122
54-Tooth #0123
- Keyboards (96 characters unless otherwise specified):

	Keybutton Engraving	Code
Canada	English/French	#K447
Canada	English	#K448
France	French	#K452
Germany	German	#K453
Italy	Italian	#K457
Japan	English	#K458
Latin	American	
Abbreviated	Spanish	#K110
Latin American		
Symbolized	Spanish	#K460
South Africa	English	#K467
United Kingdom	English	#K473

- Elements: Choice of two elements.
- Color: #C043 (pebble gray) is standard.

SPECIAL FEATURES

NON-COMMUNICATIONS FEATURES

Memory Protection (#5931): (Field install only after December, 1984.) (Mdl K65) Provides battery backup with approximately 25

MACHINES

minutes protection after power failure. Field Installation: Yes, for all mdls 65 and 85 without extended memory protection.

Typewriter Modularity Option (#8560): (Field install only after December, 1984.) (Mdls K85 and K95). Required in order to attach the 6731 Typewriter Diskette Module to the typewriter. Field Installation: Yes.

COMMUNICATIONS FEATURES

(Canada only > Typewriter Modularity Option (#8560): (Field install only after December, 1984.) (All mdls 85 and 95) (Mdl K85) Provides the interface between the 6724 and the 6733 Communication Module. Field Installation: Yes (MES 1305501). <)

MODEL CONVERSIONS

Field upgradable from model K65 to K85, specify #8521, not available after February 17, 1984. Upgrading includes an additional 8,000 characters of memory, return and advance keybuttons, semi-automatic paper insert lever and lighted carrier position indicator.

Note: Field upgrades require the removal of certain parts which become the property of IBM. Order through normal MES procedure.

- Mdl 65 to 85. Specify #8531 for US Correspondence Keyboard; specify #8536 for Latin American Keyboard. Upgrading includes an additional 8,000 characters of 12 month protected memory, return and advanced keybuttons, semi-automatic paper insert lever and lighted carrier position indicator.
- Mdl 85 to 85 (12 month protected memory). Specify #8532 for US Correspondence Keyboard; specify #8537 for Latin American Keyboard. Upgrading provides 12 month protection on the 15,500 character memory.

- Mdl 85 (with 12 month protected memory) to mdl 95. Specify #8533 for US Correspondence Keyboard; specify #8533 for Latin American Keyboard. Upgrading provides an additional 16,000 characters of memory. The total of 31,500 characters of memory is protected for six months.
- Mdl 65 to 95. Specify #8534 for US Correspondence Keyboard; specify #8538 for Latin American Keyboard. Upgrading includes an additional 24,000 characters of 6 month protected memory, return and advanced keybuttons, semi-automatic paper insert lever and lighted carrier position indicator.
- Mdl 85 to 95. Specify #8535 for US Correspondence Keyboard; specify #8539 for Latin American Keyboard. Upgrading provides an additional 16,000 characters of 6 month protected memory.

Note: Field upgrades require the removal of certain parts which become the property of IBM. Order through normal MES procedure.

ACCESSORIES (NONE)

SUPPLIES

Each 6724 shipment to the customer will include the following:

- Mdl K65: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, and two specified elements.
- Mdl K85 and K95: One Correctable Film Cassette Ribbon, one Lift-off Cassette Tape, three memory protection batteries, and two specified elements.

The following supply items may be ordered with the initial machine shipment. For pricing and additional supply information, contact IBM.

Supply Kit (#5898): Each Supply Kit contains 12 Correctable Ribbon Cassettes and six Lift-off Tapes.

6733 TYPEWRITER COMMUNICATION MODULE

NO LONGER AVAILABLE AFTER 12/17/85

PURPOSE

The 6733 adds asynchronous communication function to the Electronic Typewriters 6714 (models B85 and K85) and 6724 (model K85).

MODELS

Model 1 001: Operates asynchronously in CPT-TWX 33/35 or 128 character ASCII mode. It can use half-duplex or duplex data transmission over switched point-to-point public telephone networks or directly connected systems/terminals using a null modem.

Prerequisites: The 6714 or 6724 requires installation of Modularity Option (#8560).

Dimensions:

Width: 13.1cm (5.2 in.)
Depth: 33.8cm (13.2 in.)
Height: 17.6cm (6.9 in.)
Weight: 4.6kg (10.15 lbs.)

HIGHLIGHTS

- The 6733 Typewriter Communication Module is a desk top unit that links the Electronic Typewriter 6714 or 6724 to a data communication facility via a modem. The 6733 can interface with the following customer-supplied Western Electric (or equivalent) 2-wire, duplex modems:

- Western Electric Type 103J--dual (answer/originate) mode, with or without auto answer.
- Western Electric Type 113C--originate mode only.
- Western Electric Type 113D--answer only, with or without auto answer.
- Western Electric Type 212A--dual speed (low speed up to 300 bps or high-speed at 1200 bps), with or without auto answer, answer or originate mode.

The customer must ensure that the modem is compatible with the Communication Module.

- Asynchronous TTY line protocol.
- Full 128 ASCII character set.
- Modem interface: EIA RS-232-C.

- Operator-selectable transmission speed: 110, 150, 300 or 1200 bps.
- Auto answer and unattended document reception.
- Background reception to a 14,000 character buffer.
- Electronic Typewriter 6714/6724 offline operation including all word processing functions and quality printing while the 6733 auto answers and receives documents.
- Pacing by line and standard pacing under remote terminal or system control.
- Transfer documents from 6733 receive buffer directly to 6714/6724 document storage for delayed printing or print (and optionally store) while transferring.
- Transfer documents from the 6714/6724 storage to the communication facility with or without printing.
- Customer setup: Yes.
- Cables included: a link cable to the 6714 or 6724; an EIA RS-232-C modem cable.

Publications: "Installation and Operating Instruction", S544-4011; "Technical Description for Host Systems and Applications Programmers", S544-4013.

SPECIFY

- Power: 120V AC, 1-phase, 60 Hz (#E025)
- Power Cord: 3-wire grounded. (No specify required).
- Color: Pearl White. (No specify required).

SPECIAL FEATURES (NONE)**MODEL CONVERSIONS (NONE)****ACCESSORIES (NONE)****SUPPLIES (NONE)**

6746 WHEELWRITER® 3 TYPEWRITER®
PURPOSE

The 6746 Wheelwriter (part of the Selectric® S/2000 is a triple pitch, general purpose electronic typewriter incorporating a number of advanced functions.

MODELS
Model 001
Model 002
Customer Setup: Yes

HIGHLIGHTS

This typewriter has the following advanced features:

- Semi-automatic paper insertion
- Keyboard paper movement control
- One-half backspace
- One-line automatic correction (approximately 72 characters)
- Automatic underscore
- Caps Lock, no alternate language--All 6746 typewriters with English US/001 Keyboard.
- Alternate language, no Caps Lock---all other
- 10, 12 and 15-pitch--up to 16 characters per second
- Keyboard adjusts to three positions
- Cartridge printwheels
- Automatic pitch and impression setting with printwheel insertion
- Cassette ribbons and correction tapes.
- Automatic centering
- Options--(see special features)
 - Feature Adapter Option
 - Printer Option
 - Spell Check Option
 - Sound Hood OptionStandard

Physical Specifications:

Width : 539mm (21.4 in.)

Depth : 457mm (18.0 in.)

Height : 167mm (6.6 in.)

Weight :

Typewriter Only	15.0kg	(33.0 lbs.)
Typewriter and Packaging	21.4kg	(47.0 lbs.)
Typewriter and Packaging with Sound Hood	22.3kg	(49.0 lbs.)

SPECIFY

- Paper feed: 1, 1.5, 2 and 3
 - 6 lines per inch (25.4mm) in 10 and 12 pitch
 - 8 lines per inch (25.4mm) in 15 pitch
- Writing Line: 335mm (13.2 in)
- Pitch: Triple (10, 12 and 15)
- Printwheel: Prestige Elite
- Dust Cover: Clear
- Color: Shell Gray with Pearl White keybuttons
- Voltage: For Indonesia, Thailand, Chile, Paraguay, Uruguay, Argentina, Sri Lanka and Hong Kong --- 200V 50 Hz; for Australia and Malaysia--- 240V 50 Hz; for Peru and the Philippines--- 220V 60 Hz; for the Bahamas, Guyana, Surinam, Taiwan, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Nicaragua, Panama, Haiti and the Netherlands Antilles--- 110V 60 Hz; for Barbados and Bolivia--- 115V 50 Hz; for Bermuda, Korea,

Colombia, Venezuela, the Cayman Islands and Trinidad--- 115V 60 Hz; for Canada--- 120V 60 Hz; for Mexico--- 127V 60 Hz.

- **Line Cord:** 2-wire cord set (typewriter is double insulated). Some countries require a 3-prong plug on the 2-wire cord. These will come standard.
- **Keyboard 96 character - Dual Language** (except where shown otherwise). The following standard keyboards are listed by country, part number, keyboard language/code number, language of operator publications and alternate keyboard language/code number.

Country	P/N	Primary Keyboard Code#	Pubs	Alternate Keyboard Code#
Antigua	1341756	English US/001	Eng. US (WT)	See Note 1
Argentina	1341751	Latin American/025	Spanish	Latin Supplementary/099
Australia	1341752	English US/001	Eng. US (WT)	See Note 1
Bahamas	1341757	English US/001	Eng. US (WT)	See Note 1
Barbados	1341757	English US/001	Eng. US (WT)	See Note 1
Bermuda	1341757	English US/001	Eng. US (WT)	See Note 1
Bolivia	1341763	Latin American/025	Spanish	Latin Supplementary/099
Canada	1341760	Canadian English/037	Can.Eng.	*Canadian Bilingual/039
Canada English	1341761	Canadian Bilingual/039	Can.Fr. English/037	*Canadian
Cayman Islands	1341757	English US/001	Eng. US (WT)	See Note 1
Chile	1341762	Latin American/025	Spanish	Latin Supplementary/099
Colombia	1341763	Latin American/025	Spanish	Latin Supplementary/099
Costa Rica	1341763	Latin American/025	Spanish	Latin Supplementary/099
Dominican Republic	1341763	Latin American/025	Spanish	Latin Supplementary/099
Ecuador	1341763	Latin American/025	Spanish	Latin Supplementary/099
El Salvador	1341763	Latin American/025	Spanish	Latin Supplementary/099
Guatemala	1341763	Latin American/025	Spanish	Latin Supplementary/099
Guyana	1341757	English US/001	Eng. US(WT)	See Note 1
Haiti	1341754	Canadian English	Can. Eng.	*Canadian Bilingual/039
Honduras	1341763	Latin American/025	Spanish	Latin Supplementary/099
Hong Kong	1341772	Hong Kong/119	Eng. UK	Latin Supplementary/099
Indonesia	1341774	English US/001	Eng. US(WT)	See Note 1
Jamaica	1341757	English US/001	Eng. US(WT)	See Note 1
Japan	1341779	Japanese English/069	Japanese	Latin Supplementary/099
Japan	1341780	Katakana/221	Japanese	*Japanese English/069
Korea	1341757	English US/001	Eng. US(WT)	See Note 1
Malaysia	1341800	English UK/067	Eng. UK	*Japanese English/069
Mexico	1341966	Latin American/025	Spanish	Latin Supplementary/099
Netherlands Antilles	1341757	English US/001	Eng. US(WT)	See Note 1
New Zealand	1341965	English US/001	Eng. US(WT)	See Note 1
Nicaragua	1341763	Latin American/025	Spanish	Latin Supplementary/099
Panama	1341763	Latin American/025	Spanish	Latin Supplementary/099
Paraguay	1341762	Latin American/025	Spanish	Latin Supplementary/099
Peru	1341786	Latin American/025	Spanish	Latin Supplementary/099
Philippines	1341786	Latin America	Spanish	Latin Supplementary/099
Singapore	1341800	English UK/067	Eng. UK	*Japanese English/069
Sri Lanka	1341800	English UK/067	Eng. UK	*Japanese English/069
Surinam	1341757	English US/001	Eng. US(WT)	See Note 1
Taiwan	1341757	English US/001	Eng. US(WT)	See Note 1
Thailand	1341795	English US/001	Eng. US(WT)	See Note 1
Trinidad	1341757	English US/001	Eng. US(WT)	See Note 1
Uruguay	1341762	Latin	Spanish	Latin Supplementary/099

6746 Wheelwriter™ 3 Typewriter (cont'd)

Venezuela	1341763	American/025	Spanish	mentary/099
		Latin		
		American/025		

*Secondary Language graphics are printed on keybuttons.

Note 1: No secondary language. These typewriters have Caps Lock feature.

- Printwheel: Prestige Elite except Japan Katakana = Katakana

SPECIAL FEATURES

Feature Option Adapter: Incorporates the power supply and interface electronics for the Printer, Spell Check, Display* and Display/Printer* Options.

Printer Option: Attaches the typewriter to the Personal Computer for use as a letter quality printer.

The printer option is known to be compatible with the following programs when they are run on the the appropriate Personal Computer:

DOS 1.0 with Disk and Advanced Basic, P/N 6024001
DOS 1.1 with Disk and advanced Basic, P/N 6024001
DOS 2.0 with Disk and Advanced Basic, P/N 6024061
DOS 2.1 with Disk and Advanced Basic, P/N 6024120
Visicalc® version 1.1, P/N 6024005
Easywriter® version 1.1, P/N 6024005
IBM Macro Assembler, P/N 6024002
IBM Basic Compiler, P/N 6024003
IBM Pascal Compiler, P/N 6024010
IBM Personal Editor, P/N 6024051
Peachtext® P/N 6024039 (April 1983 or later)
Multiplane®, P/N 6024022

Visicalc®, is a registered trademark of Visicorp, Inc.
Easywriter® is a trademark of Information Unlimited Software Inc.
Peachtext® is a trademark of Peachtree Software, Inc.
Multiplane® is a registered trademark of Microsoft Corp.

The Printer Option uses a parallel printer interface that is compatible with IBM/PC/XT/PCjr. products and the above listed program products. Compatibility with other applications and/or other equipment manufacturers personal computers must be assured by the user.

The Printer Option is designed to support text printing applications. As a result some characters displayed by the IBM PC and some of those on certain keyboards will not print. In these instances the Typewriter will either treat that character as a space or not print it (NULL). Please see the Typewriter Options Operating Instructions for specifics on supported character sets and commands.

Spell Check Option: Is an interactive dictionary verifying the spelling of the equivalent of approximately 50,000 US English or UK English words commonly used in business. In addition, it contains an approximate 300-word supplement dictionary the user can fill with words unique to the particular customer, discipline or industry.

Note: The Spell Check Option is for US or UK English only. The Spell Check Option will check the spelling of US or UK English words on the Selectric® System/2000 typewriters across all keyboard languages except Bulgarian, Russian and Yugoslav-Cyrillic. The US English Spell Check and the UK Spell Check Options are separate options and cannot be used at the same time.

Optional Feature Part Numbers. (IMPORTANT: Read the footnotes.)

Country	Feature Adapter	¹ Spell Check	² Printer
Antigua	1277973	Yes	2
Argentina	1277974	Yes	2
Australia	1277973	Yes	2
Bahamas	1277973	Yes	2
Barbados	1277973	Yes	2
Bermuda	1277973	Yes	2
Bolivia	1277974	Yes	2
Canada			
(Bi-Ling)	1277962	Yes	2
Canada (Eng)	1277961	Yes	Yes+
Cayman			
Island	1277973	Yes	2
Chile	1277974	Yes	2
Colombia	1277974	Yes	2
Costa Rica	1277974	Yes	2

Dominican	1277974	Yes	2
Republic	1277974	Yes	2
Equador	1277974	Yes	2
El Salvador	1277974	Yes	2
Guatemala	1277973	Yes	2
Guyana	1277973	Yes	2
Haiti	1277973	Yes	2
Honduras	1277974	Yes	2
Hong Kong	1277973	Yes	2
Indonesia	1277973	Yes	2
Jamaica	1277973	Yes	2
Japan (Eng)	1277967	Yes	2
Korea	1277973	Yes	2
Malaysia	1277973	Yes	2
Mexico	1277974	Yes	2
Netherlands	1277964	Yes	2
Antilles	1277973	Yes	2
New Zealand	1277973	Yes	Yes
Nicaragua	1277974	Yes	2
Panama	1277974	Yes	2
Paraguay	1277974	Yes	2
Peru	1277974	Yes	2
Philippines	1277974	Yes	2
Puerto Rico	6745447	Yes	2
Singapore	1277973	Yes	2
Sri Lanka	1277973	Yes	2
Surinam	1277973	Yes	2
Taiwan	1277973	Yes	2
Thailand	1277973	Yes	2
Trinidad	1277973	Yes	2
Uruguay	1277974	Yes	2
Venezuela	1277974	Yes	2

Special Features Footnotes:

¹**Spell Check Option:** English US P/N 1317520, English UK P/N 1317522

May be used to check US or UK English words on the 6746 typewriter across all keyboard language except the Bulgarian, Russian, and Yugoslav--Cyrillic

Note: The UK Spell Check Optional Feature FCS is January 18, 1985

²**Printer Option:** P/N 1317545

May be used on the 6746 typewriters. For the 6746 typewriter, the primary keyboard must be French, German, Italian, Spanish, English UK, or English US.

Marketing of the Printer Option or the Printer/Display combination option is recommended only in the countries where IBM PC/XT/PCjr. keyboard matches one of the above keyboards.

IBM Cartridge Printwheel II and IBM Quiet® Electronic Fonts for use with the Printer Option: For the US Wheelwriter 3 and 5 typewriters and Cartridge Printwheel II PC may be used. For the French, German, Italian, Spanish, and UK 6746 typewriters use any printwheel corresponding to the country language keyboard.

The Canadian-English 6746 primary keyboard will support the Printer or Display/Printer Option. The Wheelwriter typewriter must be attached to a US PC/XT/PCjr. and must have a Cartridge Printwheel II PC installed.

Soundhood: Standard on 6746.

MODEL CONVERSIONS

A 6746 typewriter is field upgradeable to a 6747 typewriter. Removed and/or replaced parts remain the property of the customer. Allow six weeks for delivery.

Upgrade MES P/N's are as follows:

Country	P/N
Antigua	1384179
Argentina	1384193
Australia	1384192
Bahamas	1384179
Barbados	1384179
Bermuda	1384179
Bolivia	1384159
Canada	

■ **6746 Wheelwriter™ 3 Typewriter (cont'd)**

(Bi-Ling)	1384178
Canada English	1384177
Cayman	
Island	1384179
Chile	1384159
Colombia	1384196
Costa Rica	1384196
Dominican	
Republic	1384196
Equador	1384159
El Salvador	1384196
Guatemala	1384196
Guyana	1384179
Haiti	1384198
Honduras	1384196
Hong Kong	1384195
Indonesia	1384179
Jamaica	1384179
Japan English	1384194
Japan Katakana	1384168
Korea	1384179
Malaysia	1384182
Mexico	1384196
Netherlands	
Antilles	1384179
New Zealand	1384192
Nicaragua	1384196
Panama	1384196
Paraguay	1384159
Peru	1384196
Philippines	1384196
Singapore	1384182
Sri Lanka	1384182
Surinam	1384179
Taiwan	1384179
Thailand	1384179
Trinidad	1384179
Uruguay	1384159
Venezuela	1384159

ACCESSORIES

Dust Cover P/N 1337635: Included with the typewriter

SUPPLIES

Basic supplies comes with the machine. If Starter Pacs are requested the order must be entered with the machine.

Starter Pac P/N **6293725** feature code #5927

6747 WHEELWRITER 5/WHEELWRITER 6 TYPEWRITERS

PURPOSE

The 6747 WHEELWRITER 5 AND WHEELWRITER 6 Typewriters (part of the SELECTRIC(R) System/2000 typewriter family) are multi-pitch, multi-lingual, general purpose electronic typewriters incorporating a number of advanced functions and a revisable memory.

MODELS

6747 (WHEELWRITER 5 Typewriter)

6747-2 (WHEELWRITER 6 Typewriter)

HIGHLIGHTS

In addition to the features incorporated in the 6746 WHEELWRITER 3 Typewriter, all 6747 Typewriters have:

- Multi-line automatic correction (approximately 200 characters)
- Coded superscript/subscript
- Unit backspace
- Relocate
- Multi-lingual keyboard -- this function allows the operator to access US application and all non-US country keyboards. Templates (drawings) of all alternate keyboards are included in the "Operators Guide".
- Approximately 7,000-character storage on the WHEELWRITER 5 Typewriter and approximately 31,000-character storage on the WHEELWRITER 6 Typewriter. Job, letter, and sentence storage is made possible for error free playback. Up to ninety-nine (99) storage areas are accessible.
- Approximately one-year battery protection for memory
- Revise/Play by character
- Automatic carrier return
- Margin indent
- Decimal tab
- Caps lock
- Stop code
- Required space
- Required hyphen
- Proportional spacing
- Additional option: 24-Character display

In addition to the above features, the 6747 WHEELWRITER 6 Typewriter has:

- Approximately 31,000-character storage
- Advanced revision capability
 - Play by character, word, or line, to the end of a document, or to any word/phrase (up to 28 characters) keyed by operator
 - Advance by character, word, or line, to the end of a document, or to any word/phrase (up to 28 characters) keyed by operator. Repeat advance to (Find) capability.
 - Delete by character, word, or line, to the end of a document, or to any word/phrase (up to 28 characters) keyed by operator
- Margin Return
- Eight (8) format storage areas
- Directory
- Justification on payout
- Multiple word underscore
- Mark function for storing pre-printed form templates

Physical Specifications:

Width - 542mm (21.4 in.)
 Depth - 457mm (18.0 in.)
 Height - 167mm (6.6 in.)
 Weight -
 Typewriter Only - 15.0kg (33.0 lbs.) (approximate)

Typewriter and Packaging - 21.3 kg (47.0 lbs.)
 Typewriter and Packaging with Sound Hood - 22.3 kg (49.0 lbs.)

SPECIFY

- Paper feed: 1, 1.5, 2 and 3
- 6 lines per inch (25.4mm) in 10 and 12 pitch and PS.
- 8 lines per inch (25.4mm) in 15 pitch.
- Writing Line: 335mm (13.2 in)
- Pitch: 10, 12 and 15 and proportional Spacing (PS)
- Printwheel: Prestige Elite, 12 pitch Except Japan/Katakana = Katakana
- Dust Cover: Clear (optional)
- Color: Shell gray with pearl white keybuttons
- Voltage (Power Supply):
 - 100V 50-60 Hz
Japan
 - 110V, 50 Hz
Barbados and Jamaica
 - 110V, 60 Hz
Antigua, Bahamas, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Netherlands Antilles, Nicaragua, Panama, Surinam, and Taiwan
 - 115V, 60 Hz
Bermuda, Cayman Islands, Colombia, Korea, Trinidad, and Venezuela
 - 120/60
Canada
 - 127V, 60 Hz
Mexico
 - 200V, 50 Hz
Hong Kong and Sir Lanka
 - 220V, 50 Hz
Argentina, Bolivia, Chile, Indonesia, Paraguay, Thailand, and Uruguay
 - 220V, 60 Hz
Peru and Philippines
 - 230V, 50 Hz
New Zealand and Singapore
 - 240V, 50 Hz
Australia and Malaysia
- Line Cord: 2-wire cord set (typewriter is double insulated). Some countries require a 3-prong plug on the 2-wire cord. These will come standard.
- Keyboard: 96 character - Multi-Lingual. Any AFE typewriter can access any other country keyboard by typing in the cor-

rect keyboard code. The following standard keyboards are listed by country, part number, primary keyboard language/code number and the language of operator publica-

tions. Those with alternate keyboard graphics printed on the buttons are listed also.

WHEELWRITER 5 (6747) Typewriter

Country	P/N	Primary Keyboard Code #	Pubs	Alternate Keyboard Graphics
Antigua	1341811	English US/001	Eng. US	
Argentina	1341805	Latin American/025	L.A. Span.	
Australia	1341806	English US/001	Eng. US	
Bahamas	1341811	English US/001	Eng. US	
Barbados	1341811	English US/001	Eng. UK (WT)	
Bermuda	1341811	English US/001	Eng. US (WT)	
Bolivia	1341817	Latin American/025	L.A. Span.	
Canada	1341815	Canadian-Bilingual/039	Fr. Can.	Canadian-English/037
Canada	1341814	Canadian English/037	Can. Eng.	Canadian Bilingual/039
Cayman Islands	1341811	English US/001	US Eng(WT)	
Chile	1341816	Latin American/025	L.A. Span.	
Colombia	1341817	Latin American/025	L.A. Span.	
Costa Rica	1341817	Latin American/025	L.A. Span.	
Dominican Republic	1341817	Latin American/025	L.A. Span.	
Ecuador	1341817	Latin American/025	L.A. Span.	
El Salvador	1341817	Latin American/025	L.A. Span.	
Guatemala	1341817	Latin American/025	L.A. Span.	
Guyana	1341811	English US/001	Eng. US	
Haiti	1341808	Canadian English/037	Eng. UK	Canadian Bilingual/039
Honduras	1341817	Latin American/025	L.A. Span.	
Hong Kong	1341826	Hong Kong/119	Eng. UK	
Indonesia	1341828	English US/001	Eng. US	
Jamaica	1341811	English US/001	Eng. US	
Japan	1341833	Japanese English/069	Japanese	
Japan	1341834	Katakana/221	Japanese	Japanese English/069
Korea	1341811	English US/001	Eng. US	
Malaysia	1341854	English UK/067	Eng. UK	Japanese English/069
Mexico	1341969	Latin American/025	L.A. Span.	
Netherlands Antilles	1341811	English US/001	Eng. US	
New Zealand	1341968	English US/001	Eng. US	
Nicaragua	1341817	Latin American/025	L.A. Span.	
Panama	1341817	Latin American/025	L.A. Span.	
Paraguay	1341816	Latin American/025	L.A. Span.	
Peru	1341840	Latin American/025	L.A. Span.	
Philippines	1341840	Latin America	L.A. Span.	Supplementary/099
Singapore	1341854	English UK/067	Eng. UK	Japanese English/069
Sri Lanka	1341854	English UK/067	Eng. UK	Japanese English/069
Surinam	1341811	English US/001	Eng. US	
Taiwan	1341811	English US/001	Eng. US	
Thailand	1341849	English US/001	Eng. US	
Trinidad	1341811	English US/001	Eng. US	
Uruguay	1341816	Latin American/025	L.A. Span.	
Venezuela	1341817	Latin American/025	L.A. Span.	

WHEELWRITER 6 (6747-2) Typewriter

Country	P/N	Primary Keyboard Code #	Pubs	Alternate Keyboard Graphics
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Antigua	1050001	English US/001	Eng. US	
Argentina	1050025	Latin American/025	L.A. Span.	
Australia	1050055	English US/001	Eng. US	
Bahamas	1050001	English US/001	Eng. US	
Barbados	1050001	English US/001	Eng. UK	
Bermuda	1050001	English US/001	Eng. US	
Bolivia	1050090	Latin American/025	L.A. Span.	
Canada	1050035	Canadian- Bilingual/039	Fr. Can./ Eng. US	Canadian- English/037
Canada	1050005	English US/001	Eng. US	
Cayman Islands	1050001	English US/001	Eng. US	
Chile	1050025	Latin American/025	L.A. Span.	
Colombia	1050007	Latin American/025	L.A. Span.	
Costa Rica	1050007	Latin American/025	L.A. Span.	
Dominican Republic	1050007	Latin American/025	L.A. Span.	
Ecuador	1050006	Latin American/025	L.A. Span.	
El Salvador	1050007	Latin American/025	L.A. Span.	
Guatemala	1050007	Latin American/025	L.A. Span.	
Guyana	1050001	English US/001	Eng. US	
Haiti	1050003	Canadian English/037	Eng. UK	Canadian Bilingual/039
Honduras	1050007	Latin American/025	L.A. Span.	
Hong Kong	1050032	Hong Kong/119	Eng. UK	
Indonesia	1050054	English US/001	Eng. US	
Jamaica	1050001	English US/001	Eng. US	
Japan	1050046	Japanese English/069	Japanese	
Japan	1050047	Katakana/221	Japanese	Japanese English/069
Korea	1050001	English US/001	Eng. US	
Malaysia	1050034	English UK/067	Eng. UK	Japanese English/069
Mexico	1050008	Latin American/025	L.A. Span.	
Netherlands Antilles	1050001	English US/001	Eng. US	
New Zealand	1050056	English US/001	Eng. US	
Nicaragua	1050007	Latin American/025	L.A. Span.	
Panama	1050007	Latin American/025	L.A. Span.	
Paraguay	1050025	Latin American/025	L.A. Span.	
Peru	1050009	Latin American/025	L.A. Span.	
Philippines	1050415	Latin America	Eng. US	
Singapore	1050033	English US/001	Eng. US	
Sri Lanka	1050031	English UK/067	Eng. UK	Japanese English/069
Surinam	1050001	English US/001	Eng. US	
Taiwan	1050001	English US/001	Eng. US	
Thailand	1050002	English US/001	Eng. US	
Trinidad	1050001	English US/001	Eng. US	
Uruguay	1050025	Latin American/025	L.A. Span.	
Venezuela	1050006	Latin American/025	L.A. Span.	

SPECIAL FEATURES

Feature Option Adapter: Incorporates the power supply and interface electronics for the Printer, Spell Check, Display and Display/Printer Options.

Effective March 1986 IBM started shipment of modified WHEELWRITER 5 Typewriters. Modified WHEELWRITER 5 Typewriters can be identified by the following:

- Serial number of 500,001 or greater
- Installation sticker (CSU Label) with a letter "A" in a box in the lower left hand corner of the label

Modified WHEELWRITER 5 Typewriters and all WHEELWRITER 6 (6747-2) Typewriters require use of a modified Feature Adapter.

The modified WHEELWRITER Feature Adapter is compatible only with modified WHEELWRITER 5 and all WHEELWRITER 6 Typewriters. The original level WHEELWRITER Feature Adapter is compatible only with the original level WHEELWRITER 5 (6747) Typewriters.

Printer Option: Attaches the typewriter to the Personal Computer for use as a letter quality printer.

The printer option is known to be compatible with the following programs when they are run on the the appropriate personal Computer:

DOS 1.0 with Disk and Advanced Basic, P/N 6024001
DOS 1.1 with Disk and advanced Basic, P/N 6024001
DOS 2.0 with Disk and Advanced Basic, P/N 6024061
DOS 2.1 with Disk and Advanced Basic, P/N 6024102
Visicalc(R) Program version 1.1, P/N 6024005
Easywriter(R) Program version 1.1, P/N 6024005
IBM Macro Assembler, P/N 6024002
IBM Basic Compiler, P/N 6024003
IBM Pascal Compiler, P/N 6024010
IBM Personal Editor, P/N 6024051
Peachtext(R) Program, P/N 6024039 (April 1983 or later)
Multiplane(R) Program, P/N 6024022

Visicalc(R), is a registered trademark of Visicorp, Inc.

Easywriter(R) is a trademark of Information Unlimited Software, Inc.

Peachtext(R) is a trademark of Peachtree Software, Inc.

Multiplane(R) is a registered trademark of Microsoft Corporation.

The Printer Option uses a Parallel printer interface that is compatible with IBM/PC/XT/PCjr products and the above listed program products. Compatibility with other applications and/or other equipment manufacturers personal computers must be assured by the user.

The Printer Option is designed to support text printing applications. As a result some characters displayed by the IBM PC and some of those on certain keyboards will not print. In these instances the typewriter will either treat that character as a space or not print it (NULL). Please see the Typewriter Options Operating Instructions for specifics on supported character sets and commands.

Spell Check Option: Is an interactive dictionary verifying the spelling of the equivalent of approximately 50,000 words commonly used in business. In addition, it contains an approximate 300-word supplement dictionary the user can fill with words unique to the particular customer, discipline or industry. Dictionaries are available for the following languages:

- US English
- UK English

- German
- French
- Dutch
- Spanish
- Italian
- Canadian French

Note: The Spell Check Option will check the spelling of words using the installed dictionary/language on the SELECTRIC(R) System/2000 typewriters across all keyboard languages except Bulgarian, Russian and Yugoslavia-Cyrillic. Each dictionary is a separate Spell Check Option and only one option can be installed in the Feature Adapter at any one time.

Display Option: Is a cable connected twenty-four character liquid crystal display (LCD). It enhances typewriter usability by allowing errors to be detected before they are printed. Used in conjunction with the revision memory it greatly enhances revision usability.

Display/Printer Option: Is a combination module that includes all of the features and function of the separate Printer Option and Display Option. It is required when installing both the Printer and Display or all three options on the 6747 or the 6750 Typewriter.

Sound Hood Option: Includes an operator adjustable visor to reduce and/or eliminate glare. See Special Features footnote 5.

Optional Feature Part Numbers: (IMPORTANT: Read the footnotes.)

Country	Feature Adapter	Modified Feature Adapter	Spell Check	Prtr	Disp	Prtr/Disp
Antigua	1277973	1434910	Y	2	Y	2
Argentina	1277974	1434911	Y	2	Y	2
Australia	1277973	1434910	Y	Y	Y	Y
Bahamas	1277973	1434910	Y	2	Y	2
Barbados	1277973	1434910	Y	2	Y	2
Bermuda	1277993	1434910	Y	2	Y	2
Bolivia	1277974	1434911	Y	2	Y	2
Canada						
Bi-Ling	1277962	1434900	Y	2	Y	2
Canada						
English	1277961	1434953	Y	Y	Y	Y
Cayman						
Island	1277973	1434910	Y	2	Y	2
Chile	1277974	1434911	Y	2	Y	2
Colombia	1277974	1434911	Y	2	Y	2
Costa						
Rica	1277974	1434911	Y	2	Y	2
Dominican						
Republic	1277974	1434911	Y	2	Y	2
Ecuador	1277974	1434911	Y	2	Y	2
El						
Salvador	1277974	1434911	Y	2	Y	2
Guatemala	1277974	1434911	Y	2	Y	2
Guyana	1277973	1434910	Y	2	Y	2
Haiti	1277973	1434910	Y	2	Y	2
Honduras	1277974	1434911	Y	2	Y	2
Hong Kong	1277973	1434910	Y	2	Y	2
Indonesia	1277973	1434910	Y	2	Y	2
Jamaica	1277973	1434910	Y	2	Y	2
Japan						
Katakana	1277967	1434905	Y	2	Y	2
Korea	1277973	1434910	Y	2	Y	2
Malaysia	1277973	1434910	Y	2	Y	2
Mexico	1277974	1434911	Y	2	Y	2
Netherland						
Antilles	1277973	1434910	Y	2	Y	2
New						
Zealand	1277973	1434910	Y	2	Y	2
Nicaragua	1277974	1434911	Y	2	Y	2
Panama	1277974	1434911	Y	2	Y	2
Paraguay	1277974	1434911	Y	2	Y	2

MACHINES

Peru	1277974	1434911	Y	2	Y	2
Philippines	1317500	1434916	Y	2	Y	2
Puerto Rico	6745449	6745447	Y	2	Y	2
Singapore	1277973	1434910	Y	2	Y	2
Sri Lanka	1277973	1434910	Y	2	Y	2
Surinam	1277973	1434910	Y	2	Y	2
Taiwan	1277973	1434910	Y	2	Y	2
Thailand	1277973	1434910	Y	2	Y	2
Trinidad	1277973	1434910	Y	2	Y	2
Uruguay	1277974	1434911	Y	2	Y	2
Venezuela	1277974	1434911	Y	2	Y	2

Special Features Footnotes

1. Spell Check Option:

Language	Part Number
US English	1317520
UK English	1317522
German	1434800
French	1434810
Dutch	1434820
Spanish	1434830
Italian	1434840
Canadian French	1434850

2. Printer Option: P/N 1317545

Available for the 6746, 6747 or 6750 Typewriters. For the 6746 Typewriter, the primary keyboard must be French, German, Italian, Spanish, English UK, or English US. For the 6747 Typewriter, one of the above keyboards must be the primary keyboard or one of the above keyboards must be activated using the alternate (multi-lingual) keyboard function. For the 6750 Typewriter specific fonts must be used.

Marketing of the Printer Option or the Printer/Display combination option is recommended only in the countries where IBM PC/XT/PCjr keyboard matches one of the above keyboards.

For the US 6746 and 6747 Typewriters, any PC (ASCII) IBM Cartridge Printwheel II may be used. If the standard US correspondence printwheel is used, then all of the PC characters on the ASCII keyboard will not be accessible.

For the French, German, Italian, Spanish, and English UK 6746 and 6747 Typewriters use any printwheel corresponding to the country language keyboard.

The Canadian-English 6747 primary keyboard will support the Printer or Display/Printer Option. The 6747 Typewriter must be attached to a US PC/XT/PCjr and must have a PC (ASCII) Cartridge Printwheel II installed.

3. Display Option: P/N *1317550 (Board), 1342880 (Display)

It will support all country keyboards except Bulgaria, Russia, and the Yugoslavia - Cyrillic.

* The circuit board and display head must be ordered separately. The display stand comes with the display head.

May be used on the 6747 and 6750 Typewriters only.

4. Display/Printer Option: P/N *1317540 (Board), 1342880 (Display)

It will support all country keyboards except the Bulgaria, Russia, and the Yugoslavia - Cyrillic.

* The circuit board and display head must be ordered separately. The display stand comes with the display head.

May be used on the 6747 and 6750 Typewriters only. It must be used when both the Printer and the Display or all three options are to be installed.

5. Soundhood: (Canada only > Standard <) (Except Canada > Optional; P/N 1342192 <)

MODEL CONVERSIONS

A 6746 WHEELWRITER 3 Typewriter is field upgradeable to a 6747 WHEELWRITER 5 Typewriter. 6746 WHEELWRITER 3 and 6747 WHEELWRITER 5 Typewriters cannot be upgraded to a 6747 WHEELWRITER 6 (6747-2) Typewriter.

Upgrade MES P/Ns are as follows:

Country	P/N
Antigua	1384179
Argentina	1384193
Australia	1384192
Bahamas	1384179
Barbados	1384179
Bermuda	1384179
Bolivia	1384159
Canada	
(Bi-Ling)	1384178
Canada English	1384177
Cayman Island	1384179
Chile	1384159
Colombia	1384196
Costa Rica	1384196
Dominican Republic	1384196
Ecuador	1384159
El Salvador	1384196
Guatemala	1384196
Guyana	1384179
Haiti	1384198
Honduras	1384196
Hong Kong	1384195
Indonesia	1384179
Jamaica	1384179
Japan English	1384194
Japan Katakana	1384168
Korea	1384179
Malaysia	1384182
Mexico	1384196
Netherlands	
Antilles	1384179
New Zealand	1384192
Nicaragua	1384196
Panama	1384196
Paraguay	1384159
Peru	1384196
Philippines	1384196
Singapore	1384182
Sri Lanka	1384182
Surinam	1384179
Taiwan	1384179
Thailand	1384179

IBM IBM Canada Ltd.

Trinidad	1384179
Uruguay	1384159
Venezuela	1384159

ACCESSORIES

Dust Cover (P/N 1362283): Optional.

MACHINES

SUPPLIES

Basic supplies come with the machine. If Starter Pacs are requested the order must be entered with the machine (Starter Pac P/N 6293725 feature code #5927).

M 6747.6
AUG 86
MAJOR REVISION

6750 QUIETWRITER(R) 7/QUIETWRITER(R) 8 TYPEWRITER**PURPOSE**

The 6750 Quietwriter 7 and Quietwriter 8 Typewriters (part of the IBM Selectric(R) System/2000 typewriter family) are multi-pitch, multi-lingual, general purpose electronic typewriters incorporating all the features and functions of the 6747 WheelWriter 5 and 6747 WheelWriter 6 Typewriters. The Quietwriter Typewriters incorporate a unique, non-impact printing technology that provides superior acoustics, increased output speed, single ribbon correction, and easily changed font-contained character sets.

MODELS

(NO LONGER AVAILABLE)

Quietwriter 7 Typewriter - 6750

Quietwriter 8 Typewriter - 6750-2

Customer Setup (CSU): Yes, all optional features.

HIGHLIGHTS

The 6750 Quietwriter 7 and Quietwriter 8 Typewriters have all of the advanced features of the 6747 WheelWriter 5 Typewriter. Also, the Quietwriter 8 Typewriter provides the same additional features as the 6747 WheelWriter 6 Typewriter. In addition, both the Quietwriter 7 and Quietwriter 8 Typewriters provide:

- Advanced non-impact print technology which provides the following benefits:
 - Very quiet operation
 - Single supply ribbon cartridge (no lift-off tape required)
 - Letter quality print
 - Virtually undetectable correction (erase).
 - Correcting ribbons for general purpose typing applications and non-correcting ribbon for negotiable instruments and similar documents and when typewriter is used as a printer.
- Print/Erase controls
- Customer Changeable Electronic Fonts
- Expand -- doubles the width of each character
- High-speed playback:
 - 10-pitch = 40 cps (max)
 - 12-pitch = 48 cps (max)
 - 15-pitch = 60 cps (max)
 - Proportional Spacing: Approximately 48 cps average.
- Caps Lock -- Across all country language keyboards
- Options -- same as 6747
- Correction without a separate tape

Physical Specifications:

Width: 542mm (21.4 in.)

Depth: 457mm (18.0 in.)

Height: 167mm (6.6 in.)

Weight:

Typewriter Only - 12.3kg (27.0 lbs.)

Typewriter and Packaging - 18.6kg (41.0 lbs.)

Typewriter and Packaging with Sound Hood - 19.5kg (43.0 lbs.)

SPECIFY

The following require no "specific" actions. All configurations are standard.

- Keyboard: 96-character, multilingual
- Voltage (Power Supply): For Japan -- 110V 50-60 Hz; for Barbados and Jamaica -- 110V 50 Hz; for the Antigua, Bahamas, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Netherlands Antilles, Nicaragua, Panama, Surinam, and Taiwan -- 110V 60 Hz; Bermuda, Cayman Islands, Colombia, Korea, Trinidad, and Venezuela -- 115V 60 Hz; for Canada -- 120V 60 Hz; for Mexico -- 127V 60 Hz; for Hong Long and Sri Lanka -- 200V 50 Hz; for Argentina, Bolivia, Chile, Indonesia, Paraguay, Thailand and Uruguay -- 220V 50 Hz; for Peru and the Philippines -- 220V 60 Hz; for New Zealand and Singapore -- 230V 50 Hz; for Australia and Malaysia -- 240V 50 Hz.

- Line Cord: 3-wire grounded cord set.

- Machine Nomenclature:

The following standard keyboards are listed by country, part number, primary keyboard language/code number and language of operator publications. Those with alternate keyboard graphics printed on the keybuttons are listed also.

Quietwriter 7 (6750) Typewriter

- Antigua
P/N 1341857
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)
- Argentina
P/N 1341859
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish
- Australia
P/N 1341860
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)
- Bahamas
P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)
- Barbados
P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)
- Bermuda
P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)
- Bolivia
P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish
- Canada
P/N 1341867
Primary Language/Keyboard Code: Canadian
Bilingual/039
Publication: French Canadian

Alternate Keyboard Graphics: Canadian English/037

- Canada

P/N 1341862
Primary Language/Keyboard Code: Canadian English/037
Publication: Canadian English
Alternate Keyboard Graphics: Canadian Bilingual/039

- Cayman Islands

P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- Chile

P/N 1341868
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Colombia

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Costa Rica

P/N 1341909
Primary Language/Keyboard Code: Latin American /025
Publication: Spanish

- Dominican Republic

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Ecuador

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- El Salvador

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Guatemala

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Guyana

P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- Haiti

P/N 1341971
Primary Language/Keyboard Code: Canadian English/037
Publication: UK English
Alternate Keyboard Graphics: Canadian Bilingual/039

- Honduras

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Hong Kong

P/N 1341878
Primary Language/Keyboard Code: Hong Kong/119
Publication: UK English

- Indonesia

P/N 1341880

Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- Jamaica

P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- Japan

P/N 1341884
Primary Language/Keyboard Code: Japanese English/069
Publication: Japanese

- Japan

P/N 1341885
Primary Language/Keyboard Code: Katakana/221
Publication: Japanese
Alternate Keyboard Graphics: Japanese English/069

- Korea

P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- Malaysia

P/N 1341910
Primary Language/Keyboard Code: UK English/067
Publication: UK English
Alternate Keyboard Graphics: Japanese English/069

- Mexico

P/N 1341970
Primary Language/Keyboard Code: Latin American/025
Alternate Keyboard Graphics: Spanish

- Netherlands Antilles

P/N 1341864
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- New Zealand

P/N 1341860
Primary Language/Keyboard Code: US English/001
Publication: US English (WT)

- Nicaragua

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Panama

P/N 1341909
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Paraguay

P/N 1341890
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Peru

P/N 1341865
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Philippines

P/N 1341865
Primary Language/Keyboard Code: Latin American/025
Publication: Spanish

- Singapore
 - P/N 1341910
 - Primary Language/Keyboard: UK English/067
 - Publication: UK English
 - Alternate Keyboard Graphics: Japanese English/069
- Sri Lanka
 - P/N 1341910
 - Primary Language/Keyboard: UK English/067
 - Publication: UK English
 - Alternate Keyboard Graphics: Japanese English/069
- Surinam
 - P/N 1341864
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English (WT)
- Taiwan
 - P/N 1341864
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English (WT)
- Thailand
 - P/N 1341903
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English (WT)
- Trinidad
 - P/N 1341864
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English (WT)
- Uruguay
 - P/N 1341890
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Venezuela
 - P/N 1341909
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Quietwriter 8 (6750-2) Typewriter**
- Antigua
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English (WT)
- Argentina
 - P/N 1050105
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Australia
 - P/N 1050106
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Bahamas
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Barbados
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Bermuda
 - P/N 1050109
- Bolivia
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Canada
 - P/N 1050306
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Canada
 - P/N 1050376
 - Primary Language/Keyboard Code: Canadian Bilingual/039
 - Publication: Canadian French/US
 - Alternate Keyboard Graphics: Canadian English/037
- Canada
 - P/N 1050375
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Cayman Islands
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Chile
 - P/N 1050113
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Colombia
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Costa Rica
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American /025
 - Publication: Spanish
- Dominican Republic
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Ecuador
 - P/N 1050156
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- El Salvador
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Guatemala
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Guyana
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Haiti
 - P/N 1050154
 - Primary Language/Keyboard Code: Canadian English/037
 - Publication: UK English
 - Alternate Keyboard Graphics: Canadian Bilingual/039

- Honduras
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Hong Kong
 - P/N 1050123
 - Primary Language/Keyboard Code: Hong Kong/119
 - Publication: UK English
- Indonesia
 - P/N 1050125
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Jamaica
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Japan
 - P/N 1050129
 - Primary Language/Keyboard Code: Japanese English/069
 - Publication: Japanese
- Japan
 - P/N 1050130
 - Primary Language/Keyboard Code: Katakana/221
 - Publication: Japanese
 - Alternate Keyboard Graphics: Japanese English/069
- Korea
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Malaysia
 - P/N 1050151
 - Primary Language/Keyboard Code: UK English/067
 - Publication: UK English
 - Alternate Keyboard Graphics: Japanese English/069
- Mexico
 - P/N 1050153
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Netherlands Antilles
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- New Zealand
 - P/N 1050106
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Nicaragua
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Panama
 - P/N 1050150
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Paraguay
 - P/N 1050105
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Peru
 - P/N 1050110
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Philippines
 - P/N 1050110
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Singapore
 - P/N 1050373
 - Primary Language/Keyboard: US English/001
 - Publication: US English
- Sri Lanka
 - P/N 1050151
 - Primary Language/Keyboard: UK English/067
 - Publication: UK English
 - Alternate Keyboard Graphics: Japanese English/069
- Surinam
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Taiwan
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Thailand
 - P/N 1050145
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Trinidad
 - P/N 1050109
 - Primary Language/Keyboard Code: US English/001
 - Publication: US English
- Uruguay
 - P/N 1050105
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Venezuela
 - P/N 1050156
 - Primary Language/Keyboard Code: Latin American/025
 - Publication: Spanish
- Paper Feed: 1, 1.5, 1 and 3
- 6 lines per inch (25.4mm) in 19, 12 pitch and PS
- 8 lines per inch (25.4mm) in 15 pitch
- Writing Line: 335mm (13.2 in.)
- Pitch: 10, 12, 15 and Proportional Spacing
- Dust Cover: Clear (Canada only > Optional <)
- Color: Shell Gray with Pearl White keybuttons
- Font: Prestige Elite Prestige Elite except Japan Katakana = Katakana 10 pitch
- Printhead Cleaning Cartridge

SPECIAL FEATURES

Feature Option Adapter: The Feature Option Adapter incorporates the power supply and interface electronics for the Printer, Spell Check, Display* and Display/Printer* Options.

Printer Option: The Printer Option attaches the typewriter to the IBM Personal Computer for use as a letter quality printer.

The printer option is known to be compatible with the following programs when they are run on the appropriate IBM Personal Computer:

- DOS 1.0 with Disk and Advanced Basic, P/N 6024001
- DOS 1.1 with Disk and Advanced Basic, P/N 6024001
- DOS 2.0 with Disk and Advanced Basic, P/N 6024061
- DOS 2.1 with Disk and Advanced Basic, P/N 6024120
- VisiCalc(R) version 1.1, P/N 6024004
- EasyWriter(TM) version 1.1, P/N 6024005
- IBM Macro Assembler, P/N 6024002
- IBM Basic Compiler, P/N 6024003
- IBM Pascal Compiler, P/N 6024010
- IBM Personal Editor, P/N 6024051
- Peachtext(TM), P/N 6024039 (April 1983 or later)
- Multiplan(R), P/N 6024022

- VisiCalc is a registered trademark of VisiCorp, Inc.
- EasyWriter is a trademark of Information Unlimited Software, Inc.
- Peachtext is a trademark of Peachtree Software, Inc.
- Multiplan is a registered trademark of Microsoft Corp.

The Printer Option uses a Parallel printer interface that is compatible with IBM PC/XT/PCjr products and the above listed program products. Compatibility with other applications and/or other equipment manufacturers personal computers must be assured by the user.

The Printer Option is designed to support text printing applications. As a result some characters displayed by the IBM PC and some of those on certain keyboards will not print. In these instances the typewriter will either treat that character as a space or not print it (NULL). Please see the "Typewriter Options Operating Instructions" for specifics on supported character sets and commands.

Spell Check Option: The Spell Check Option is an interactive dictionary verifying the spelling of the equivalent of approximately 50,000 US English or UK English words commonly used in business. In addition, it contains an approximate 300-word supplemental dictionary the user can fill with words unique to the particular customer, discipline or industry.

Note: The Spell Check Option is for US English or UK English only. The Spell Check Option will check the spelling of US English or UK English words on the IBM Selectric System/2000 TYPEWRITERS across all keyboard languages except Bulgarian, Russian and Yugoslavian Cyrillic. The US English Spell Check and the UK English Spell Check Options are separate options and cannot be used on the same typewriter at the same time.

Display Option*: The Display Option is a cable connected 24-character liquid crystal display. It enhances typewriter usability by allowing errors to be detected before they are printed. Used in conjunction with the approximate 7,000 character memory it greatly enhances revision usability.

Display/Printer Option*: The Display/Printer Option is a combination module that includes all of the features and function of the separate Printer Option and Display Option. It is required when installing both the Printer and Display or all 3 Options on the 6747 or the 6750 Typewriter.

Sound Hood Option: The Sound Hood includes an operator adjustable visor to reduce and/or eliminate glare. See "Special Features" Footnote 5.

* 6747 and 6750 Typewriters only.

Optional Features Part Numbers: (IMPORTANT: Read the footnotes)

Country	Feature Adapter	S p e l l c h e c k	C h e c k e r	P r i n t e r	D i s p l a y	P/D r/i s i/s n/p t/l e/a r/y
Antigua	1277993	Y	2	Y	2	
Argentina	1277993	Y	2	Y	2	
Australia	1277993	Y	Y	Y	Y	
Bahamas	1277993	Y	2	Y	2	
Barbados	1277993	Y	2	Y	2	
Bermuda	1277993	Y	2	Y	2	
Bolivia	1277994	Y	2	Y	2	
Canada Bilingual	1277982	Y	2	Y	2	
Canada (English)	1277981	Y	Y+	Y	Y+	
Cayman Islands	1277993	Y	2	Y	2	
Chile	1277994	Y	2	Y	2	
Colombia	1277994	Y	2	Y	2	
Costa Rica	1277994	Y	2	Y	2	
Dominican Repub	1277994	Y	2	Y	2	
Ecuador	1277994	Y	2	Y	2	
El Salvador	1277994	Y	2	Y	2	
Guatemala	1277994	Y	2	Y	2	
Guyana	1277993	Y	2	Y	2	
Haiti	1277993	Y	2	Y	2	
Honduras	1277994	Y	2	Y	2	
Hong Kong	1277993	Y	2	Y	2	
Indonesia	1277993	Y	2	Y	2	
Jamaica	1277993	Y	2	Y	Y	
Japan (Katakana)	1277987	Y	2	Y	2	
Korea	1277993	Y	2	Y	2	
Malaysia	1277993	Y	2	Y	2	
Mexico	1277994	Y	2	Y	2	
Nether Antilles	1277993	Y	2	Y	2	
New Zealand	1277993	Y	Y	Y	Y	
Nicaragua	1277994	Y	2	Y	2	
Panama	1277994	Y	2	Y	2	
Peru	1277994	Y	2	Y	2	
Philippines	1277994					
Puerto Rico	6755448	Y	2	Y	2	
Singapore	1277993	Y	2	Y	2	
Sri Lanka	1277993	Y	2	Y	2	
Surinam	1277993	Y	2	Y	2	
Taiwan	1277993	Y	2	Y	2	
Thailand	1277993	Y	2	Y	2	
Trinidad	1277993	Y	2	Y	2	
Uruguay	1277994	Y	2	Y	2	
Venezuela	1277994	Y	2	Y	2	

Special Feature Footnotes:

1. Spell Check Option:

- US English (P/N 1317530)
- UK English (P/N 1317553)
- German (P/N 1434800)
- French (P/N 1434810)
- Dutch (P/N 1434820)
- Spanish (P/N 1434830)
- Italian (P/N 1434840)
- Danish (P/N 1434870)
- Canadian French (P/N 1434850)

2. Printer Option: (P/N 1317565)

Available for 6746, 6747, and 6750 Typewriters. For the 6746 Typewriter, the primary keyboard must be French, German, Italian, Spanish, UK English, or US English. For the 6747 Typewriter, one of the above keyboards must be the primary keyboard or one of the above keyboards must be activated using the alternate (multi-lingual) keyboard function. For the 6750 Typewriter specific fonts must be used.

Marketing of the Printer Option or the Printer/Display combination option is recommended only in the countries where IBM PC/XT/PCjr keyboards match one of the above keyboards.

For the 6750 Typewriter regardless of country, one of the following fonts must be used:

Typestyle	Reorder #
Artisan 12	1340849
Boldface	1340827
Bookface Academic	1340848
Courier 10	1340807
Courier 12	1340813
Courier 12 Italic	1340857
Courier 15	1340816
Delegate	1340854
Dual Gothic	1340853
Letter Gothic	1340822
Modern	1340856
Olde World	1340850
Orator	1340845
Presentor	1340846
Prestige Elite	1340800
Prestige Pica	1340832
Prestige 15	1340804
Script	1340852
Title	1340835

3. Display Option: P/N 1317570 (Board)* -- P/N 1342880 (Display)*

It will support all country keyboards except Bulgaria, Russia and the Yugoslavian Cyrillic.

* World Trade must order the circuit board and display head separately. The display stand comes with the display head.

4. May be used on the 6747 and 6750 Typewriters only.
5. Display/Printer Option: P/N 1317560 (Board)* -- P/N 1342880 (Display)*
- It will support all country keyboards except Bulgaria, Russia and the Yugoslavian Cyrillic.
- * World Trade must order the circuit board and display head separately. The display stand comes with the display head.
6. May be used on the 6747 and the 6750 Typewriters only. It must be used when both the Printer and the Display or all three Options are to be installed.
7. Sound Hood: P/N 1342192 - Standard on 6746 and 6747 only

MODEL CONVERSIONS (NONE)

ACCESSORIES (INCLUDED WITH THE TYPEWRITER)

Dust Cover (P/N 1337635).

IBM Quiet(R) Printhead Cleaning Cartridge 6750 (P/N 1299633)
(Canada only > Optional. <) (Except Canada > Standard. <)

SUPPLIES

Basic supplies come with the machine. If Starter Pacs are requested, the order must be entered with the machine order.

6670 WHEELWRITER SYSTEMS

PURPOSE

The Wheelwriter(R) systems (of the IBM Selectric(R) System/2000) provide advanced revision typewriter functions with modular functional growth. A system consists of four Customer Set Up (CSU) elements: an 80 character display mounted on a moveable keyboard and an electronic function pack with random access memory attached to an impact printer (up to 16 cps) using printwheel technology. A system using Function Pack 20 (F.P. 20) is referred to as System/20. A system using Function Pack 40 (F.P. 40) and Textpack A cartridge is referred to as a System/40.

MODELS

Model 020 Wheelwriter System/20 (U.S.): Includes F.P. 20 which contains the advanced revision typewriter functions, 16K bytes of RAM (with battery back up) providing user storage of approximately 11,500 characters, and U.S. keyboard and manuals.

Model 021 Wheelwriter System/20 (Puerto Rico): Same as Model 021, but with Latin American keyboard and manuals in Spanish.

Model 040 Wheelwriter System/40 (U.S.): Includes F.P. 40 which contains 32K bytes of RAM (with battery back up) providing user storage of approximately 26,000 characters. F.P. 40 has three slots for user insertable cartridges, with one slot reserved for RAM extension cartridges and the other two for application program cartridges (one of which must be TEXTPACK A, provided with F.P. 40, which contains the advanced revision typewriter functions).

Model 041 Wheelwriter System/40 (Puerto Rico): Same as Model 040, but with Latin American keyboard and manuals in Spanish.

Customer Setup (CSU): Yes.

HIGHLIGHTS

In addition to the features incorporated into the 6747 Typewriter, the Wheelwriter systems provide:

- Movable keyboard with an 80 character full line display.
- Storage of approximately 11,500 characters (S/20) or 26,000 characters (S/40).
- Automatic correction of up to a full page, depending upon amount of unused user storage.
- Enhanced document revision, format storage, forms feature via mark function, delay print by line, alternate language selection, annotated stop code, storage location directory, and memory available query.
- Modular growth by change or addition of features, i.e., user insertable function packs and cartridges.

Physical Specifications:

Width - 549.5mm (21.6 in.)

Depth - 571.5mm (22.5 in.)
Height - 182.5mm (7.2 in.)
Weight - 15.5kg (34 lbs.)

Publications

"Installation and Reference for the Selectric System/2000, Wheelwriter System/20 and System/40" (S544-4054-0)
"Quick Reference for the Selectric System/2000, Wheelwriter System and Quietwriter(R) System" (S544-4053-0)
"Operating Instructions for the Selectric System/2000, Wheelwriter System/20 and Quietwriter System/40" (S544-4065-0)
"Textpack A Operating Instructions for the Selectric System/2000, Wheelwriter System/40 and Quietwriter System/40" (S544-4052-0)

Appropriate manuals are shipped with each system model or function pack order.

SPECIFY

This system requires no "specify" actions. All configurations are standard.

- Voltage (Power Supply): Argentina, Chile, Hong Kong, Indonesia, Malaysia, New Zealand, Paraguay, Peru, Philippines, Singapore, Sri Lanka, Thailand, Uruguay -- 180-259V/49.5-60.5 Hz; all others -- 90-137V/49.5-60.5 Hz
- Line Cord: Grounding type (three-wire) 8 ft. electrical cord and plug.
- Paper: Printer contains a 425mm (16.73 in.) platen which allows it to handle a wide range of types, weights and sizes of materials.
- Paper Feed: 1, 1.5, 2 and 3
 - 6 lines per inch (25.4mm) in 10, 12 pitch and PS
 - 8 lines per inch (25.4mm) in 15 pitch
- Writing Line: 335mm (13.2 in.)
- Pitch: 10, 12, 15 and Proportional Spacing
- Printwheel: Prestige Elite except Japan Katakana = Katakana
- Color: Shell Gray with Pearl White keybuttons
- Keyboards (96 character, multilingual): Any physical keyboard can access any other country or special keyboard/character set as all are programmed in the system. However, a different printwheel (Wheelwriter systems) or font (Quietwriter systems) may need to be inserted in order to print the other keyboard characters. Keyboards are shipped as shown per country. Additional keyboard graphics are shown in parenthesis.

Keyboards

Keyboard	Code	Part No.	Pubs.	Countries
Australian	001	1335901	U.S. English	Australia/ New Zealand
Canadian Bilingual (Canadian English)	039 037)	1335903	Fr. Canadian	Canada
Canadian English (Canadian Bilingual)	037 039)	1335904	U.K. English	Canada, Haiti

MACHINES

Hong Kong	119	1335911	U.K. English	Hong Kong
Japanese English (Japanese Katakana	069 221)	1335914	Japanese	Japan
Japanese Katakana (Japanese English	221 069)	1335915	Japanese	Japan
Latin American (Tab .)	025	1335916	Spanish	Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru, Philippines
Latin American (Tab ,)	025	1335933		Argentina, Bolivia, Chile, Ecuador, Paraguay, Uruguay, Venezuela
U.K English (Japanese English	067 069)	1335925	U.K English	Malaysia, Sri Lanka
U.S. English	001	1340601	U.S. English	Antigua, Bahamas, Barbados, Bermuda, Cayman Islands, Guyana, Indonesia, Jamaica, Korea, Netherlands Antilles, Singapore, Surinam, Taiwan, Thailand, Trinidad

SPECIAL FEATURES

Optional features: All Customer Setup.

- Function Pack 20 (6776/403): Contains 16K bytes of RAM (with battery back up) and provides the advanced revision typewriter functions. Provides user storage of approximately 11,500 characters.
- Function Pack 20 (6776/404): Same as above but shipped with operating instructions in Spanish.
- Function Pack 40 (6776/405): Contains 32K bytes of RAM (with battery back up). Provides user storage of approximately 26,000 characters. It has three slots for user insertable cartridges, with one slot reserved for RAM extension cartridges and the other two for application program cartridges (one of which must be Textpack A which provides typewriter functions as contained in F.P. 20).
- Function Pack 40 (6776/400): Same as above but shipped with operating instructions in Spanish.
- STORAGE 16 Cartridge (#1236902): Provides user storage of approximately 14,500 characters of RAM storage with non-replaceable battery backup.
- LEARN I Cartridge (#1246561): Provides interactive tutorial on basic typing and memory/storage.
- LEARN II Cartridge (#1236888): Provides interactive tutorial on advanced typing and memory/storage.

- HELP Cartridge (#1236619): Provides interactive assistance for operator in answering function questions.
- SPELL CHECK Cartridge: Provides interactive or batch verification of approximately 50,000 words, with provision for a user-unique, approximately 300 word, supplemental dictionary.

U.S. English - #1236820
U.K English - #1246511
National French - #1246512
Canadian French - #1246513
German - #1246514
- SOUND HOOD (#1340730): Standard Available for Wheelwriter system only.

MODEL CONVERSIONS

A Wheelwriter S/20 is user upgradeable to a S/40 by replacing F.P. 20 with F.P. 40 and Textpack A cartridge.

ACCESSORIES (NONE)

SUPPLIES (NONE)

6780 QUIETWRITER SYSTEMS**PURPOSE**

The Quietwriter(R) systems (of the IBM Selectric(R) System/2000) provide advanced revision typewriter functions with modular functional growth and incorporate the features and functions of the 6770 Wheelwriter systems. They consist of the same basic Customer Setup elements, but employ a non-impact printer (up to 60 cps) using resistive ribbon technology. This non-impact printing will not make carbon, carbonless, or multipart form copies. A system using Function Pack 20 (F.P. 20) is referred to as a System/20. A system using Function Pack 40 (F.P. 40) and Textpack A cartridge is referred to as a System/40.

MODELS

Model 020 Quietwriter System/20 (U.S.): Includes F.P. 20 which contains the advanced revision typewriter functions, 16K bytes of RAM (with battery back up) providing user storage of approximately 11,500 characters, and U.S. keyboard and manuals.

Model 021 Quietwriter System/20 (Puerto Rico): Same as Model 020, but with Latin American keyboard and manuals in Spanish.

Model 040 Quietwriter System/40 (U.S.): Includes F.P. 40 which contains 32K bytes of RAM (with battery back up) providing user storage of approximately 26,000 characters. F.P. 40 has three slots for user insertable cartridges, with one slot reserved for RAM extension cartridges and the other two for application program cartridges (one of which must be Textpack A, provided with F.P. 40, which contains the advanced revision typewriter functions).

Model 041 Quietwriter System/40 (Puerto Rico): Same as Model 040, but with Latin American keyboard and manuals in Spanish.

Customer Setup (CSU): Yes.

HIGHLIGHTS

These systems have all the advanced features of the Wheelwriter(R) systems plus:

- Advanced non-impact print technology which provides the following benefits:
 - Very quiet operation
 - Single supply ribbon cartridge (no lift-off tape required)
 - Virtually undetectable correction (erase). The use of the correcting ribbon is not recommended for negotiable instruments or similar documents.
- Print/Erase controls
- Two on-line user changeable electronic fonts, each with up to 220 characters, which support a wide range of keyboard character sets without physical replacement of print font.
- Expand
 - Doubles the width of each character
- High-Speed playback
 - 10-pitch = 40 cps (max)
 - 12-pitch = 48 cps (max)
 - 15-pitch = 60 cps (max)
 - Proportional Spacing: Approximately same as 12-pitch
- Caps Lock - Across all country language keyboards

Physical Specifications:

Width - 549.5mm (21.6 in.)
Depth - 571.5mm (22.5 in.)
Height - 182.5mm (7.2 in.)
Weight - 15 kg (33 lbs.)

SPECIFY

This system requires no "specify" actions. All configurations are standard.

- Voltage (Power Supply): Argentina, Australia, Chile, Hong Kong, Indonesia, Malaysia, New Zealand, Paraguay, Peru, Philippines, Singapore, Sri Lanka, Thailand, Uruguay -- 180-259V/49.5-60.5 Hz.; all others -- 90-137V/49.5-60.5 Hz.
- Line Cord: Grounding type (three-wire) 8 ft. electrical cord and plug.
- Paper: Printer contains a 425mm (16.73 in.) platen which allows it to handle a wide range of types, weights and sizes of materials. It will not make carbon, carbonless, or multipart form copies. It should not be used to type bank checks or other negotiable instruments because the characters can be completely erased. The printer prints and erases best on smooth, xerographic papers. See "Paper Recommendations" in the "Installation and Reference manual".
- Paper Feed: 1, 1.5, 2, and 3
 - 6 lines per inch (25.4mm) in 10, 12 pitch and PS
 - 8 lines per inch (25.4mm) in 15 pitch
- Writing Line: 335mm (13.2 in.)
- Pitch: 10, 12, 15 and Proportional Spacing
- Font: Prestige Elite; except Japan Katakana = Katakana.
- Color: Shell Gray with Pearl White keybuttons
- Keyboards: See 6770 Wheelwriter "Keyboard Description". Keyboards are the same.

SPECIAL FEATURES

See "Special Features" in 6670 Wheelwriter description. Special Features are the same.

MODEL CONVERSIONS

A Quietwriter System/20 is user upgradable to a System/40 by replacing Function Pack 20 with Function Pack 40 and Textpack A cartridge.

ACCESSORIES

IBM QUIET(TM) Printhead Cleaning Cartridge, P/N 1299633

SUPPLIES

6801 COPIER II
PURPOSE

The 6801 Copier II can handle pages in books of any thickness, and portions of oversized originals that can be rolled up or folded, such as engineering drawings or maps.

MODELS
Model 001
Dimensions:

Width: 107.3cm (41 in.)
Depth: 74.9cm (28 in.)
Height: 118.1cm (43 in.)
Weight: 371.3kg (825 lbs.)

SPECIFY

• **Power:**

Voltage	Phase	50 Hz	60 Hz
115V	1		#A881
200V	1	#A062	#A055
200V with neutral	3	#A066	#A070
200V w/o neutral	3	#A074	#A078
220V	1	#A970	#A056
220V with neutral	3	#A067	#A071
220V w/o neutral	3	#A075	#A079
230V	1	#A064	#A051
230V with neutral	3	#A068	#A072
230V w/o neutral	3	#A076	#A080
240V	1	#A065	#A057
240V with neutral	3	#A069	#A073
240V w/o neutral	3	#A077	#A081

• **Paper Group:**

Width	Length	Alternate Length	Code
203mm (8 in.)	267mm (10.5 in.)	343mm (13.5 in.)	#A002
203mm (8 in.)	254mm (10 in.)	330mm (13 in.)	#A003
210mm (8.268 in.)	270mm (10.6 in.)	297mm (11.6 in.)	#A004
210mm (8.268 in.)	297mm (11.6 in.)	356mm (14 in.)	#A005
216mm (8.5 in.)	279mm (11 in.)	356mm (14 in.)	#A001
216mm (8.5 in.)	279mm (11 in.)	330mm (13 in.)	#A006

• **Language Group:** The language group consists of preprinted instructions which appear on the machine such as "Lift Cover", "Remove Copies", "Not Ready", "Add Paper", etc.

English UK	#2257	German	#2259
English US	#2265	Italian	#2261
English/French	#2264	Spanish	#2262
French	#2258		

SPECIAL FEATURES

Radio Frequency Interference Elimination Filter (#A120, #A121: Specify #A120 for 60 Hz, #A121 for 50 Hz. **Field Installation:** Yes.

Carpet Rails (#A138): **Field Installation:** Yes.

Meter Control System (#A230, #A895, #A995: Specify #A230 for the meter, #A895 for 60 HZ receptacle, #A995 for 50 HZ receptacle. **Field Installation:** Yes.

Convenience Collator (#3154, #3155: Specify #3154 for 50 Hz, #3155 for 60 Hz. **Field Installation:** Yes.

MODEL CONVERSIONS (None)
SUPPLIES

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5881): Each Pac contains four cartridges of toner.

SERs

Adjustable Copy Number Selector (SER 472076)
Coin Meter 50 Hz (SER 572376)
(Australia and Canada only)
Coin Operation Device (SER 472192) +)
Dual Letter Page Size 10 1/2 - 11 - 14 in. (SER 472253)
Dual Legal Page Size 10 1/2 - 13 - 14 in. (SER 972027)
Dual Legal Page Size 11 - 13 - 14 in. (SER 972026)
External Keylock (SER 272001)
External Billing Meter (50 Hz) (SER 372035)
External Keylock Controlled Meter (SER 572020)
External Key Controlled Multi/Single Conv (SER 572447)

Flexible Document Cover (SER 572351)
Foot Control (parallels "B" button) (SER 272017)
Line Cord: 11 through 30 feet (SER 372102)
Painted Covers:

Classic Blue (SER 972019)
Emerald Green (SER 972009)
Garnet Rose (SER 972012)
Pearl White (SER 972017)
Raven Black (SER 972011)
Sandstone Beige (SER 972008)
Topaz Bronze (SER 972014)
Willow Green (SER 972013)

Paper Length: 12/14 in. (SER 372119)

Contact IBM for particulars.

MACHINES
6802 COPIER III Mdl 10
PURPOSE

The 6802 Copier III model 10 is a high-speed plain-paper copier/duplicator that can print on both sides of a piece of paper automatically, and collate the output.

MODELS
Model 004 6802 Copier III

Dimensions:

Width: 106.7cm (42 in.)
Depth: 68.6cm (27 in.)
Height: 116.8cm (46 in.)
Weight: 463.5kg (1,030 lbs.)

HIGHLIGHTS

Single sheets are automatically fed on to the document glass, positioned, and after last copy is made, original is ejected into the original exit tray. No "A" button is required.

Copies are printed on both sides of a piece of paper through the use of a duplexing feature, thus saving on paper and storage cost. Duplexing is entirely automatic and does not require the operator to manually reverse the paper.

Single Original Automatic feed. Maximum size: 215.9mm x 355.6mm (8-1/2 x 14 in.) When Automatic Feed is not used maximum size is: 304.8 x 431.8mm (12 x 17 in.)

Exit Pocket Capacity: Approximately 400 sheets.

Automatic machine misfeed recovery, side one only.

Provides the ability to make copies lighter or darker.

Has a push button copy quantity selector ranging from 1 to 999 copies.

Copy paper is stored in two trays with a total capacity of about 2,700 sheets.

Delivery Speed: First copy 4.5 seconds (varies with special features selected). Subsequent copies at 1.6 second intervals. Copies per hour (rated speed) 4,500.

SPECIFY

- Power:

Voltage	Phase	50 Hz	60 Hz
120/208-120/240V (Canada only)	1		#A883
200-220-230-240V	1		#A884
200-220-230-240V with neutral	3		#A885
200-220-230-240V w/o neutral	3		#A886
220V	1	#A970	
220V with neutral	3	#A971	
200V w/o neutral	3	#A972	
200-230-240V	1	#A973	
200-230-240V with neutral	3	#A974	
200-230-240V w/o neutral	3	#A975	
- Paper Group:
 - Group 1 **#P876***
 - 203 x 267mm (8.0 x 10.5 in.)
 - 216 x 279mm (8.5 x 11.0 in.)
 - 216 x 330mm (8.5 x 13.0 in.)
 - 216 x 356mm (8.5 x 14.0 in.)
 - Group 2 **#P877**
 - 210 x 297mm (8.2 x 11.6 in.)
 - 216 x 279mm (8.5 x 11.0 in.)
 - 216 x 330mm (8.5 x 13.0 in.)
 - 216 x 356mm (8.5 x 14.0 in.)
 - Group 3 **#P878**
 - 203 x 254mm (8.0 x 10.0 in.)
 - 203 x 330mm (8.0 x 13.0 in.)
 - 210 x 297mm (8.2 x 11.6 in.)
 - 216 x 356mm (8.5 x 14.0 in.)

Group 4 #P879

210 x 270mm (8.2 x 10.6 in.)
210 x 297mm (8.2 x 11.6 in.)
210 x 310mm (8.2 x 12.2 in.)
216 x 356mm (8.5 x 14.0 in.)

* Supplied as standard if no other paper group is specified.

- Language Group: The language group consist of preprinted instructions which appear on the machine such as "Lighter Copy", "Darker Copy", "Reduce", "Alternate Paper", "Duplex", etc.

English UK #2257	German #2259
English/French	Italian #2261
(Canada Only) #2264	Spanish #2262
English US #2265	Spanish Latin
French #2258	America # 2719

- Color: Charcoal Gray (no specify required).

SPECIAL FEATURES

Carpet Rails (#A134): Carpet rails for the base machine and the primary collator. **Note:** If selected, then feature code **#A137** must be chosen on the secondary collator. See M6852 pages for details. **Field Installation:** Yes.

Resetable Billing Meter (#A278): Allows the user to count number of copies. The meter can manually be set to zero. **Field Installation:** Yes.

Meter System and Receptacle (#5989): Enables the customer to allocate usage to various departmental programs or special projects within an organization or location. The meter system consist of a single receptacle mounted in a small cabinet, plus one or more pluggable meters. A meter must be inserted into the receptacle to initiate a copy cycle. Each meter automatically records the number of copies made. Any number of meters may be used. IBM meters are not compatible with competitive copying machines. **Field installation:** An MES must be submitted through Boulder CO, USA.

Radio Frequency Interference Elimination Filter (RFI)
Electromagnetic Compatibility (EMC): The RFI and/or EMC may be ordered only for field installation from Boulder CO, USA.

Collator: 20 bin or 40 bin. See M6852 pages for details. **Field Installation:** Yes.

MODEL CONVERSIONS (None)
ACCESSORIES (None)
RPQs

Offset Masters (RPQ 176103): Allows offset masters to be more easily processed. Ordered through normal MES procedure using RPQ 176103.

Third Party Interface (RPQ 673027): Is available for customers who wish to limit copy usage using meter systems not manufactured by IBM. This connector provides a cable interface that connects the meter-system to the 6802. Ordered through normal MES procedure using RPQ 673027.

Front Door Lock (RPQ 773123): This feature provides a front-door lock permitting access to the inside of the 6802 only to those people having the key to the lock. Ordered through normal MES procedure using RPQ 773123.

SUPPLIES

Each 6802 shipment to the customer will include the following: One lens cloth; one cleaning cloth; one drop cloth; one key operator manual; one carton toner; one vacuum cleaner bag; one special cleaning cloth for the fuser hot roll.

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5961): Each Pac includes two cartridges of high-yield toner, nine cartons of 8-1/2 x 11 in. multi-system paper, and one carton of 8-1/2 x 14 in. multi-system paper.

MACHINES

6803 COPIER III MDL 20
PURPOSE

The 6803 Copier III model 20 is a high-speed plain-paper copier/duplicator that can print on both sides of a piece of paper automatically, reduce unwieldy documents to letter page size, and collate the output.

MODELS

Model 004 6803 Copier III model 20.

Dimensions:

Width: 116.8cm (46 in.)
Depth: 68.6cm (27 in.)
Height: 116.8cm (46 in.)
Weight: 513.0kg (1,140 lbs.)

HIGHLIGHTS

Single sheets are automatically fed on to the document glass, positioned, and after last copy is made, original is ejected into the original exit tray. No "A" button is required.

Copies are printed on both sides of a piece of paper through the use of a duplexing feature, thus saving on paper and storage cost. Duplexing is entirely automatic and does not require the operator to manually reverse the paper.

Single Original Automatic feed. Maximum size: 304.8mm x 381mm (12 x 15 in.) When Automatic Feed is not used maximum size is: 304.8 x 431.8mm (12 x 17 in.)

Exit Pocket Capacity: Approximately 400 sheets.

Automatic machine misfeed recovery, side one only.

Provides the ability to reduce originals 26% or 35%.

Provides the ability to make copies lighter or darker.

Has a push button copy quantity selector ranging from 1 to 999 copies.

Copy paper is stored in two trays with a total capacity of about 2,700 sheets.

Delivery Speed: First copy 4.5 seconds (varies with special features selected). Subsequent copies at 1.6 second intervals. Copies per hour (rated speed) 4,500.

SPECIFY

- Power:

Voltage	Phase	50 Hz	60 Hz
120/208-120/240V (Canada only)	1		#A883
200-220-230-240V	1		#A884
200-220-230-240V with neutral	3		#A885
200-220-230-240V w/o neutral	3		#A886
220V	1	#A970	
220V with neutral	3	#A971	
200V w/o neutral	3	#A972	
200-230-240V	1	#A973	
200-230-240V with neutral	3	#A974	
200-230-240V w/o neutral	3	#A975	
- Paper Group:

Group 1 #P876*

 - 203 x 267mm (8.0 x 10.5 in.)
 - 216 x 279mm (8.5 x 11.0 in.)
 - 216 x 330mm (8.5 x 13.0 in.)
 - 216 x 356mm (8.5 x 14.0 in.)

Group 2 #P877

 - 210 x 297mm (8.2 x 11.6 in.)
 - 216 x 279mm (8.5 x 11.0 in.)
 - 216 x 330mm (8.5 x 13.0 in.)
 - 216 x 356mm (8.5 x 14.0 in.)

Group 3 #P878

203 x 254mm (8.0 x 10.0 in.)
203 x 330mm (8.0 x 13.0 in.)
210 x 297mm (8.2 x 11.6 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 4 #P879

210 x 270mm (8.2 x 10.6 in.)
210 x 297mm (8.2 x 11.6 in.)
210 x 310mm (8.2 x 12.2 in.)
216 x 356mm (8.5 x 14.0 in.)

* Supplied as standard if no other paper group is specified.

- Language Group: The language group consist of preprinted instructions which appear on the machine such as "Lighter Copy", "Darker Copy", "Reduce", "Alternate Paper", "Duplex", etc.

English UK	#2257	German	#2259
English/French		Italian	#2261
(Canada Only)	#2264	Spanish	#2262
English US	#2265	Spanish Latin	
French	#2258	America	# 2719

- Color: Charcoal Gray (no specify required).

SPECIAL FEATURES

Carpet Rails (#A134): Carpet rails for the base machine and the primary collator. **Note:** If selected, then feature code **#A137** must be chosen on the secondary collator. See M6852 pages for details. **Field Installation:** Yes.

Resetable Billing Meter (#A736): Allows the user to count number of copies. The meter can manually be set to zero. **Field Installation:** Yes.

Meter System and Receptacle (#5989): Enables the customer to allocate usage to various departmental programs or special projects within an organization or location. The meter system consist of a single receptacle mounted in a small cabinet, plus one or more pluggable meters. A meter must be inserted into the receptacle to initiate a copy cycle. Each meter automatically records the number of copies made. Any number of meters may be used. IBM meters are not compatible with competitive copying machines. **Field installation:** An MES must be submitted through Boulder CO, USA.

Radio Frequency Interference Elimination Filter (RFI)

Electromagnetic Compatibility (EMC): The RFI and/or EMC may be ordered only for field installation from Boulder CO, USA.

Collator: 20 bin or 40 bin. See M6852 pages for details. **Field Installation:** Yes.

MODEL CONVERSIONS (None)
ACCESSORIES (None)
RPQs

Offset Masters (RPQ 176103): Allows offset masters to be more easily processed. Ordered through normal MES procedure using RPQ 176103.

Front Door Lock (RPQ 773123): This feature provides a front-door lock permitting access to the inside of the 6803 only to those people having the key to the lock. Ordered through normal MES procedure using RPQ 773123.

Third Party Interface (RPQ 973024): Is available for customers who wish to limit copy usage using meter systems not manufactured by IBM. This connector provides a cable interface that connects the meter-system to the 6803. Ordered through normal MES procedure using RPQ 973024.

SUPPLIES

Each 6803 shipment to the customer will include the following: One lens cloth; one cleaning cloth; one drop cloth; one key operator manual; one carton toner; one vacuum cleaner bag; one special cleaning cloth for the fuser hot roll.

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5961): Each Pac includes two cartridges of high-yield toner, nine cartons of 8-1/2 x 11 in. multi-system paper, and one carton of 8-1/2 x 14 in. multi-system paper.

MACHINES

6805 COPIER III MDL 30
PURPOSE

The 6805 Copier III model 30 is a high-speed plain-paper copier/duplicator that can print on both sides of a piece of paper automatically, and collate the output.

MODELS
Model 001 6805 Copier III model 30

Dimensions:

Width: 107.3cm (42-1/4 in.)
Depth: 74.9cm (29-1/2 in.)
Height: 118.1cm (46-1/2 in.)
Weight: 477.0kg (1,050 lbs.)

HIGHLIGHTS

Single sheets are automatically fed on to the document glass, positioned, and after last copy is made, original is ejected into the original exit tray. No "A" Button is required.

Copies are printed on both sides of a piece of paper through the use of a duplexing feature, thus saving on paper and storage cost. Duplexing is entirely automatic and does not require the operator to manually reverse the paper.

The document feed will accept single sheets size of 216mm x 356mm (8-1/2 x 14 in.) maximum.

Exit Pocket Capacity: Approximately 250 copies.

Automatic job recovery.

Provides the ability to make copies lighter or darker.

Has a push button copy quantity selector ranging from 1 to 999 copies.

Copy paper is stored in two trays with a total capacity of about 2,700 sheets.

Delivery Speed: First copy 4.5 seconds (varies with special features selected). Subsequent copies at 1.6 second intervals. Copies per hour (rated speed) 4,200

SPECIFY

• Power:			
Voltage	Phase	50 Hz	60 Hz
120/208-120/240V (Canada only)	1		#A883
200-220-230-240V	1		#A884
200-220-230-240V with neutral	3		#A885
200-220-230-240V w/o neutral	3		#A886
220V	1	#A970	
220V with neutral	3	#A971	
200V w/o neutral	3	#A972	
200-230-240V	1	#A973	
200-230-240V with neutral	3	#A974	
200-230-240V w/o neutral	3	#A975	

• Paper Group:

Group 1 **#P876 ***

203 x 267mm (8.0 x 10.5 in.)
216 x 279mm (8.5 x 11.0 in.)
216 x 330mm (8.5 x 13.0 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 2 **#P877**

210 x 297mm (8.2 x 11.6 in.)
216 x 279mm (8.5 x 11.0 in.)
216 x 330mm (8.5 x 13.0 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 3 **#P878**

203 x 254mm (8.0 x 10.0 in.)
203 x 330mm (8.0 x 13.0 in.)
210 x 297mm (8.2 x 11.6 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 4 **#P879**

210 x 270mm (8.2 x 10.6 in.)
210 x 297mm (8.2 x 11.6 in.)
210 x 310mm (8.2 x 12.2 in.)
216 x 356mm (8.5 x 14.0 in.)

* Supplied as standard if no other paper group is specified.

- Language Group: The language group consist of preprinted instructions which appear on the machine such as "Lighter Copy", "Darker Copy", "Reduce", "Alternate Paper", "Duplex", etc.

English UK	#2257	German	#2259
English/French		Italian	#2261
(Canada Only)	#2264	Spanish	#2262
English US	#2265	Spanish Latin	
French	#2258	America	# 2719

- Color: Charcoal Gray (no specify required).

SPECIAL FEATURES

Carpet Rails (#A134): Carpet rails for the base machine and the primary collator. **Note:** If selected, then feature code **#A137** must be chosen on the secondary collator. See M6852 pages for details. **Field Installation:** Yes.

Copier Control Feature (#A238): Provides the capability of controlling copier access and allocating copier usage to the responsible individual and/or department. Authorized personnel are assigned an identification code number (a maximum of 5-digit code). This code must be entered through the numerical pad on the control panel to activate the copier. The number of copies for each user is counted and stored electronically in the copier. Periodically the Key Operator can retrieve the total number of copies for each assigned user. This information can be used for internal department billings. **Field Installation:** Yes.

(Canada only) **Phase Adapter Plug (#A249):** Provides for replacing none IBM plugs used with none IBM copiers. **Field Installation:** Yes. -)

Third Party Interface (#5988): This feature is available for customers who wish to limit copy usage using meter systems not manufactured by IBM. This connector provides a cable interface that connects the meter-system to the 6805. **Field installation:** Yes.

Meter System and Receptacle (#5989): Enables the customer to allocate usage to various departmental programs or special projects within an organization or location. The meter system consist of a single receptacle mounted in a small cabinet, plus one or more pluggable meters. A meter must be inserted into the receptacle to initiate a copy cycle. Each meter automatically records the number of copies made. Any number of meters may be used. IBM meters are not compatible with competitive copying machines. **Field installation:** An MES must be submitted through Boulder CO, USA.

Radio Frequency Interference Elimination Filter (RFI)

Electromagnetic Compatibility (EMC): The RFI and/or EMC may be ordered only for field installation from Boulder CO, USA. **Collator** 20 bin or 40 bin. See M6852 pages for details. **Field Installation:** Yes.

MODEL CONVERSIONS (None)
ACCESSORIES (None)

RPQs Offset Masters (RPQ 176103): Allows offset masters to be more easily processed. Ordered through normal MES procedure using RPQ 176103.

Resetable Billing Meter (RPQ 600604): Allows the user to count number of copies. The meter can manually be set to zero. Ordered through normal MES procedure using RPQ 600604.

Front Door Lock (RPQ 773123): This feature provides a front-door lock permitting access to the inside of the 6805 only to those people having the key to the lock. Ordered through normal MES procedure using RPQ 773123.

SUPPLIES

Each 6805 shipment to the customer will include the following: One lens cloth; one cleaning cloth; one drop cloth; one key operator manual; one carton toner; one vacuum cleaner bag; one special cleaning cloth for the fuser hot roll.

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.



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M 6805.2
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MACHINES

6805 Copier III Mdl 30 (cont'd)

Starter Pac (#5962): Each Pac includes two cartridges of high-density toner, nine cartons of 8-1/2 x 11 in. multi-system paper, and one carton of 8-1/2 x 14 in. multi-system paper.



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MACHINES

M 6806.1
Feb 84

6806 COPIER III MDL 40

PURPOSE

The 6806 Copier III model 40 is a high-speed plain-paper copier/duplicator that can print on both sides of a piece of paper automatically, reduce unwieldy documents to letter page size, and collate the output.

MODELS

Model 001 6806 Copier III model 40.

Dimensions:

Width: 120.6cm (47-1/2 in.)
Depth: 74.9cm (29-1/2 in.)
Height: 118.1cm (46-1/2 in.)
Weight: 544.0kg (1,200 lbs.)

HIGHLIGHTS

Single sheets are automatically fed on to the document glass, positioned, and after last copy is made, original is ejected into the original exit tray. No "A" Button is required.

Copies are printed on both sides of a piece of paper through the use of a duplexing feature, thus saving on paper and storage cost. Duplexing is entirely automatic and does not require the operator to manually reverse the paper.

Single Original Automatic feed. Maximum size: 304.8mm x 381mm (8-1/2 x 14 in.) When Automatic Feed is not used maximum size is: 304.8 x 431.8mm (12 x 17 in.)

Exit Pocket Capacity: Approximately 250 sheets.

Automatic job recovery.

Provides the ability to reduce originals 26% or 35%.

Provides the ability to make copies lighter or darker.

Has a push button copy quantity selector ranging from 1 to 999 copies.

Copy paper is stored in two trays with a total capacity of about 2,700 sheets.

Delivery Speed: First copy 4.5 seconds (varies with special features selected). Subsequent copies at 1.6 second intervals. Copies per hour (rated speed) 4,200.

SPECIFY

Power:	Phase	50 Hz	60 Hz
Voltage			
120/208-120/240V (Canada only)	1		#A883
200-220-230-240V	1		#A884
200-220-230-240V with neutral	3		#A885
200-220-230-240V w/o neutral	3		#A886
220V	1	#A970	
220V with neutral	3	#A971	
200V w/o neutral	3	#A972	
200-230-240V	1	#A973	
200-230-240V with neutral	3	#A974	
200-230-240V w/o neutral	3	#A975	

Paper Group:

Group 1 #P876*

203 x 267mm (8.0 x 10.5 in.)
216 x 279mm (8.5 x 11.0 in.)
216 x 330mm (8.5 x 13.0 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 2 #P877

210 x 297mm (8.2 x 11.6 in.)
216 x 279mm (8.5 x 11.0 in.)
216 x 330mm (8.5 x 13.0 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 3 #P878

203 x 254mm (8.0 x 10.0 in.)
203 x 330mm (8.0 x 13.0 in.)
210 x 297mm (8.2 x 11.6 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 4 #P879

210 x 270mm (8.2 x 10.6 in.)
210 x 297mm (8.2 x 11.6 in.)
210 x 310mm (8.2 x 12.2 in.)
216 x 356mm (8.5 x 14.0 in.)

* Supplied as standard if no other paper group is specified.

- Language Group: The language group consist of preprinted instructions which appear on the machine such as "Lighter Copy", "Darker Copy", "Reduce", "Alternate Paper", "Duplex", etc.

English UK	#2257	German	#2259
English/French (Canada Only)	#2264	Italian	#2261
English US	#2265	Spanish	#2262
French	#2258	Spanish Latin America	# 2719

- Color: Charcoal Gray (no specify required).

SPECIAL FEATURES

Carpet Rails (#A134): Carpet rails for the base machine and the primary collator. **Note:** If selected, then feature code #A137 must be chosen on the secondary collator. See M6852 pages for details. **Field Installation:** Yes.

Copier Control Feature (#A238): Provides the capability of controlling copier access and allocating copier usage to the responsible individual and/or department. Authorized personnel are assigned an identification code number (a maximum of 5 digit code). This code must be entered through the numerical pad on the control panel to activate the copier. The number of copies for each user is counted and stored electronically in the copier. Periodically the Key Operator can retrieve the total number of copies for each assigned user. This information can be used for internal department billings. **Field Installation:** Yes.

(Canada only) **Phase Adapter Plug (#A249):** Provides for replacing none IBM plugs used with none IBM copiers. **Field Installation:** Yes. +)

Third Party Interface (#5988): This feature is available for customers who wish to limit copy usage using meter systems not manufactured by IBM. This connector provides a cable interface that connects the meter-system to the 6806. **Field installation:** Yes.

Meter System and Receptacle (#5989): Enables the customer to allocate usage to various departmental programs or special projects within an organization or location. The meter system consist of a single receptacle mounted in a small cabinet, plus one or more pluggable meters. A meter must be inserted into the receptacle to initiate a copy cycle. Each meter automatically records the number of copies made. Any number of meters may be used. IBM meters are not compatible with competitive copying machines. **Field installation:** An MES must be submitted through Boulder CO, USA.

Radio Frequency Interference Elimination Filter (RFI)

Electromagnetic Compatibility (EMC): The RFI and/or EMC may be ordered only for field installation from Boulder CO, USA.

Collator: 20 bin or 40 bin. See M6852 pages for details. **Field Installation:** Yes.

MODEL CONVERSIONS (None)

ACCESSORIES (None)

RPQs

Offset Masters (RPQ 176103): Allows offset masters to be more easily processed. Ordered through normal MES procedure using RPQ 176103.

Resetable Billing Meter (RPQ 600604): Allows the user to count number of copies. The meter can manually be set to zero. Ordered through normal MES procedure using RPQ 600604.

Front Door Lock (RPQ 773123): This feature provides a front-door lock permitting access to the inside of the 6806 only to those people having the key to the lock. Ordered through normal MES procedure using RPQ 773123.

6806 Copier III Mdl 40 (cont'd)

SUPPLIES

Each 6806 shipment to the customer will include the following: One lens cloth; one cleaning cloth; one drop cloth; one key operator manual; one carton toner; one vacuum cleaner bag; one special cleaning cloth for the fuser hot roll.

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5962): Each Pac includes two cartridges of high-density toner, nine cartons of 8-1/2 x 11 in. multi-system paper, and one carton of 8-1/2 x 14 in. multi-system paper.

MACHINES
6808 COPIER III MDL 60
PURPOSE

The Copier III is a high-speed plain-paper copier/duplicator that can print on both sides of a piece of paper automatically, reduce unwieldy documents to letter page size, and collate the output.

MODELS
Model 001

Prerequisites: Feature SADF (#A150) or ADF (#A151) and Non-Reduction Feature (#5977) or Reduction Feature (#5978) must be specified. See "Special Features".

Dimensions:

Width: 124.5cm (49 in.)
Depth: 74.9cm (29-1/2 in.)
Height: 120.0cm (47-1/4 in.)
Weight: 544.0kg (1,200 lbs.)

HIGHLIGHTS

- The 6808 represents a modular copier concept that is a significant addition to the Copier III family of copier products. It allows customers to add features to their basic machine, in their office, as they need them or remove features as their needs change.
- Single sheets are automatically fed on the document glass, positioned, and after last copy is made, original is ejected into the original exit tray. No "A" Button is required.
- Copies are printed on both sides of a piece of paper through the use of a duplexing feature, thus saving on paper and storage cost. Duplexing is entirely automatic and does not require the operator to manually reverse the paper.
- Single Original Automatic feed Maximum size: 304.8 x 381mm 8-1/2 x 14 in.) When Automatic Feed is not used maximum size is 304.8 x 431.8mm (12 x 17 in.)
- Exit Pocket Capacity : Approximately 250 sheets.
- Job Interrupt Feature allows the operator the convenience of interrupting a job for priority copies. At the completion of the priority job, machine recalls the instructions of the original job and resumes where it was interrupted.
- Automatic Checkout Capability allows the CE to quickly verify that the machine is working properly at the completion of a service call, which improves machine serviceability.
- Provides the ability to reduce originals 26% or 35%.
- Provides the ability to make copies lighter or darker.
- Has a push button copy quantity selector ranging from 1 to 999 copies.
- Copy paper is stored in two trays with a total capacity of about 2,700 sheets.
- Delivery Speed: First copy 4.5 seconds (varies with special features selected). Subsequent copies 1.6 seconds intervals copies per hour (rated speed) 4,200.

SPECIFY

- Power:

Voltage	Phase	50 Hz	60 Hz
120/208-120/240V	1		#A883
200-230-240V with neutral	3	#A974	
- Paper Group:
 - Group 1 **#P876**
 - 203 x 267mm (8.0 x 10.5 in.)
 - 216 x 279mm (8.5 x 11.0 in.)
 - 216 x 330mm (8.5 x 13.0 in.)
 - 216 x 356mm (8.5 x 14.0 in.)
 - Group 2 **#P877**
 - 210 x 297mm (8.2 x 11.6 in.)
 - 216 x 279mm (8.5 x 11.0 in.)
 - 216 x 330mm (8.5 x 13.0 in.)
 - 216 x 356mm (8.5 x 14.0 in.)

Group 3 #P878

203 x 254mm (8.0 x 10.0 in.)
203 x 330mm (8.0 x 13.0 in.)
210 x 297mm (8.2 x 11.6 in.)
216 x 356mm (8.5 x 14.0 in.)

Group 4 #P879

210 x 270mm (8.2 x 10.6 in.)
210 x 297mm (8.2 x 11.6 in.)
210 x 310mm (8.2 x 12.2 in.)
216 x 356mm (8.5 x 14.0 in.)

- Language Group: The language groups consist of preprinted instructions which appear on the machine such as "Lighter Copy", "Darker Copy", "Reduce", "Alternate Paper", "Duplex", etc.

English/French **#2264**
English W.T. **#2257**
English US **#2265**
French **#2258**

- Color: Pearl White, Charcoal Gray end covers (no specify required).

SPECIAL FEATURES

Carpet Rails (#A134): Carpet rails for the base machine and the primary collator. Note: If selected then feature code **#A137** must be chosen on the secondary collator. See M6852 pages for details. **Field Installation:** Yes.

Semi-Automatic Document Feed (SADF) (#A150): The horizontal SADF entry tray provides enhanced application flexibility and improved reliability. **Field Installation:** Yes.

Automatic Document Feed (ADF) (#A151): The ADF automatically feeds a stack of up to 50 originals ranging in size from 203mm x 254mm (8 x 10 in.) to 297mm x 420mm (11.69 x 16.54 in.), and weight from 60 to 105g/sq.m (16-20 lbs) originals. However, each stack of originals placed in the ADF must be of the same size and weight. **Field Installation:** Yes.

Copier Control Feature (#A238): Provides the capability of controlling copier access and allocating copier usage to the responsible individual and/or department. Authorized personnel are assigned an identification code number (a maximum of 5 digit code). This code must be entered through the numerical pad on the control panel to activate the copier. The number of copies for each user is counted and stored electronically in the copier. Periodically the Key Operator can retrieve the total number of copies for each assigned user. This information can be used for internal department billings. **Field Installation:** Yes.

Phase Adapter Plug (#A249): Provides for replacing none IBM plugs used with none IBM copiers. **Field Installation:** Yes.

Non-reduction Feature (#5977): **Field Installation:** Yes.

Reduction Feature (#5978): Provides for reducing originals 26% or 35% in size. **Field Installation:** Yes.

Third Party Interface (#5988): This feature is available for customers who wish to limit copy usage using meter systems not manufactured by IBM. This connector provides a cable interface that connects the meter-system to the 6808. **Field installation:** Yes.

Meter System and Receptacle (#5989): Enables the customer to allocate usage to various departmental programs or special projects within an organization or location. The Meter system consist of a single receptacle mounted in a small cabinet, plus one or more pluggable meters. A meter must be inserted into the receptacle to initiate a copy cycle. Each meter automatically records the number of copies made. Any number of meters may be used. IBM meters are not compatible with competitive copying machines. **Field installation:** An MES must be submitted through Boulder CO USA.

Radio Frequency Interference Elimination Filter (RFI) Electromagnetic Compatibility (EMC): The RFI and/or EMC may be ordered only for field installation from Boulder CO USA.

Collator: 20 bin or 40 bin. See M6852 pages for details. **Field Installation:** Yes.

MODEL CONVERSIONS (None)
ACCESSORIES (None)



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MACHINES

M 6808.2
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6808 Copier III mdl 60 (cont'd)

RPQs

Offset Masters (RPQ 176103): Allows offset masters to be more easily processed. Ordered through normal MES procedure using RPQ 176103.

Resetable Billing Meter (RPQ 600604): Allows the user to count number of copies. The meter can manually be set to 0. Ordered through normal MES procedure using RPQ 600604.

Front Door Lock (RPQ 773123): This feature provides a front-door lock permitting access to the inside of the 6808 only to those people having the key to the lock. Ordered through normal MES procedure using RPQ 773123.

SUPPLIES

Each 6808 shipment to the customer will include the following: One lens cloth; one cleaning cloth; one drop cloth; one key operator manual; one carton toner; one vacuum cleaner bag; one special cleaning cloth for the fuser hot roll.

The following supplies items may be ordered with the initial machine shipment. For pricing and additional supply information, Contact IBM.

Starter Pac (#5962): Each Pac includes two cartridges of high-density toner, nine cartons of 8-1/2 x 11 in. multi-system paper, and one carton of 8-1/2 x 14 in. multi-system paper.

MACHINES

6852 COLLATOR**PURPOSE**

Collator for the copier III machines.

MODELS

Model 004	20 bin 60 Hz (Primary model)
Model 003	20 bin 60 Hz (Secondary model additional 20 bin)
Model 014	20 bin 50 Hz (Primary model)
Model 013	20 bin 50 Hz (Secondary model additional 20 bin)

Prerequisites: The 6802 or 6803 copiers must be equipped with the Collator Attachment Feature #A132 to enable it to accept a collator.

Dimensions:

Primary (20 bins)	Secondary (for total of 40 bins)
Width: 46cm (18 in.)	Width: 46cm (18 in.)
Depth: 68cm (27 in.)	Depth: 68cm (27 in.)
Height: 105cm (41-1/2 in.)	Height: 96.5cm (38 in.)
Weight: 81kg (180 lbs.)	Weight: 61kg (135 lbs.)

HIGHLIGHTS

The collator is designed to simplify paper handling by automatically assembling sets of copies in sequential order. Each collator bin holds approximately 100 sheets of 20 lb. bond paper.

SPECIFY

- **Collator Attachment Feature (#A132):** The 6802 or 6803 copiers must be equipped with this feature to enable it to accept a collator. This feature is ordered with the 6802 or 6803 collator.
- **Color:** Charcoal gray (no specify required).

SPECIAL FEATURES

Carpet Rails (#A137): Carpet rails for the secondary collator. Carpet rails (#A134) for base machine and the primary collator is a prerequisite. See appropriate machine pages for the base machine.

TERMS and CONDITIONS

Plan Offering: Rent, 1 year Educational Allowance: Yes
 lease, 2 year lease, 3 year Customer Setup: No
 lease, purchase.
Warranty: 90 days
Termination Charge: Yes

MODEL CONVERSIONS

Compatibility Feature (#C056): Allows conversion of a currently installed collator on 6802 or 6803 to be attached to the 6805 or 6806 copier.

Compatibility Feature (#C069): Allows conversion of a currently installed collator on 6805 or 6806 to be attached to the 6808 copier.

ACCESSORIES (None)**SUPPLIES (None)**

7171 ASCII DEVICE ATTACHMENT CONTROL UNIT**PURPOSE**

Provides an ASCII Device Attachment Control Unit (DACU) that can attach to a variety of full-duplex ASCII devices, including the IBM 3101, 3161 or 3163, to 43XX, 308X, and 9370 processors via a block multiplexer channel.

MODELS

Model 1 001: Base model 16 ports.

Prerequisites: 4331, 4341, 4361, 4381, 3083, 3084, 9373, 9375, or 9377 S/370 Block Multiplexer Channel.

HIGHLIGHTS

The 7171 provides ASCII to IBM 3270 protocol conversion and direct channel attachment for ASCII displays and printers to host processors. It attaches locally to a Block Multiplexer channel and appears to the host processor as one or two 3274 mdl 1D Control Units connected to 3278 terminals or 328X printers in system mode. The 7171 will support up to 64 devices operating in full-duplex mode connected to it via an asynchronous EIA RS-232-C/CCITT V.24 interface.

There are improved human factors and functional capabilities over the standard 3270. These include type-ahead capability (unlocked keyboard), key redefinition, enhanced handling of blanks and nulls, column tabbing and line wrapping.

Flexible communications attachment options are available. Devices may be connected directly to the 7171 without modems or via leased/switched lines using line drivers, modems or acoustic couplers. Data rates per device can be up to 19.2K bps. Autobaud selection is provided.

The devices that can be attached are defined via characteristics in Terminal Definition Tables which are contained in the 7171. To be supported, the devices, at a minimum, must perform the following functions:

- Point-to-point connection
- 7-bit ASCII codes
- Full-duplex protocol
- Character mode transmission
- Clear-screen or clear to end-of-screen
- Absolute cursor positioning
- A character written to a screen position should replace (not overstrike) the previous character in the position

In addition, the following device features are desirable and will be used if present:

- Transmitting cursor movement keys
- Transmitting program function keys
- "Bell" function
- Controllable indicator to signal "insert" mode
- Erase to end of line (required for APL terminals)

Programming Support: The 3274 emulation capability of the 7171 allows attached devices to utilize existing 3270 programming support subject to inherent limitations of the attached devices.

A 7171 Support utility diskette is included with the unit. It provides an easy-to-use menu-driven method to define, modify and save

ASCII device definition tables. The utility executes on an IBM PC with 128K memory, keyboard, monochrome screen and 160Kb diskette drive. If an IBM PC is not available, device definition tables may be defined at the machine level. Use of the IBM PC support utility is strongly recommended if new terminal tables are to be added.

The 7171 is supported as one or two 3274 mdl 1D Control Units by the VM/SP and MVS operating systems.

Problem Analysis and Resolution: The 7171 is designed to facilitate analysis and resolution of malfunctions by following easy-to-use Problem Determination Procedures. These procedures may be performed by IBM or by the customer.

Customer Responsibilities: The customer is responsible for:

1. Adequate site, system and other physical preparation.
2. Obtaining communication cables.
3. Receipt at the customer's receiving dock, unpacking and placement of the 7171.
4. Physical setup and connection of cables to communication lines/modems.
5. Creating Terminal Definition Tables to match local configurations.

Installation: The 7171 can be placed up to 200 linear feet from the host. The 7171 attaches to the block, multiplexer channel. CE will install and attach the 7171 to the channel. Customers will attach their terminal devices.

Publications:

- GA37-0002 IBM 7171 ASCII Device Attachment Control Unit Product Overview Brochure
- GA24-4019 Description and Planning Guide
- GA24-4020 Reference Manual and Programming Guide

SPECIFY

- (Canada only) > Voltage: Standard voltage is 100/120V, 50 or 60 Hz. <)
- (Except Canada) > Voltage (200/240V AC or 100/127V AC, 1-phase, 3-wire, 50/60 Hz): Specify #2804 for low voltage 100/127V. <)
- Color: Pearl white with pebble gray sides (no specify required).
- Machine Nomenclature: US English only.
- Power Cord: Standard is 1.8m (6 ft).
- (Canada only) > Waterproof Power Connector (#9000): Provides a special waterproof connector instead of the normal plug on the power cable. This connector is sometimes required to satisfy local ordinances needing this type of termination in specific locations within an installation. See "IBM 7171 ASCII Device Attachment Control Unit Description and Planning Guide" (GA24-4019) for the mating receptacle which the customer must have installed. <)

SPECIAL FEATURES

Eight Line Increment (#4000): Provides additional ASCII ports on the base machine in increments of eight lines. Maximum: A maximum

MACHINES

of six increments may be specified, bringing the total number of ASCII ports available on the 7171 to 64. Field Installation: No.

Eight Line Addition (#4003): Provides additional ASCII ports on the base machine in increments of eight lines. Maximum: A maximum of six increments may be specified, bringing the total number of ASCII ports available on the 7171 to 64. Field Installation: Yes. This feature will be shipped as a 7171 Terminal Controller installed by the customer.

MODEL CONVERSIONS (NONE)

ACCESSORIES

Communication Cables: Not provided with the 7171. The customer must provide all communication cables. The following wiring diagram supports direct device attachments:

Terminal		7171
End		
Protective Ground	1 ----- 1	Protective Ground
Transmit data	2 ----- 3	Receive data
Receive data	3 ----- 2	Transmit data
Request		Carrier

to send	4 --*-- 8	detect
Clear to send	5 --*	
Data set ready	6 --*-- 20	Data terminal ready
	*-- 6	Data set ready
Signal ground	7 ----- 7	Signal ground
	*-- 22	Ring Indicator
Carrier detect	8 --*-- 4	Request to send
	*-- 5	Clear to send

A leased line connection requires a cable with direct attachment of pins 1 through 6 and pin 20. A switched line connection requires pins 1 through 8 and pins 20 and 22.

See "IBM 7171 ASCII Device Attachment Control Unit Description and Planning Guide" (GA24-4019) for a complete cable description.

SUPPLIES (NONE)

7350 IMAGE PROCESSING SYSTEM

PURPOSE

Provides sophisticated interactive analysis of high resolution color image data. The 7350 is an integrated image processing and display workstation that is channel-attachable to S/370 architecture processors. The 7350 will operate under VM/CMS or MVS operating systems. No change is required in the host processor software.

The image processing capabilities of the 7350 can be applied to a wide variety of projects including satellite image analysis, geology, microbiology, material inspection, seismic interpretation, textile design, and electron microscope image analysis. Users of complex simulation or modeling programs who conventionally produce large quantities of numeric output can significantly reduce the time involved in data interpretation by using the 7350 to present results in image format.

The 7350 Image Processing System consists of:

- 7351 Control Unit
- 7352 Color Image Display Station
- 7353 Conversational Monitor Station

The system also provides a keyboard and a joystick unit attached to the 7353. An optional 5083 model 1 Tablet or 5277 Mouse is also supported via a second RS-232C interface.

MODELS

The only models and features available with the 7350 workstation are associated with the 7351 Control Unit. This unit can be purchased with one to six storage buffers, each capable of containing 1MB of image data.

Model 1	001	Has six storage buffers
Model 2	002	Has five storage buffers
Model 3	003	Has four storage buffers
Model 4	004	Has three storage buffers
Model 5	005	Has two storage buffers
Model 6	006	Has one storage buffer

HIGHLIGHTS

- Integrated image processing and display workstation directly attachable to S/370 architecture computers.
- 7351 Control Unit
 - Standard S/370 channel interface and cabling
 - Interface based on 3274 model 1-D Control Unit
 - Extended 3270 data stream mode is used to access and control unique 7351 functions
 - Control unit supports one 7352 Color Image Display Station and one 7353 Conversational Display Station
 - Image Processing Subsystem contains special logic for high speed programmable image processing:
 - Image Processor Arithmetic Logic Unit
 - Look-up table for each storage buffer
 - Separate Classification look-up table
 - Interpolator
 - Histogrammer
 - Random Address Processor
 - Mask Buffer
 - One to six megabytes of dedicated local memory for storage of image data
 - Display Subsystem: Three 8-bit Digital-to-Analog Converters driving RGB display permitting simultaneous display of up to 4,096 colors selected from a palette of 16 million high resolution refresh buffers - 1024 x 1024 pixels, 13 bits/pixel pseudo color look-up table overlay plane for text/graphics annotation blink control
 - Vector Processing Subsystem:
 - Dedicated microprocessor
 - Accepts vector orders and produces rasterized output
 - Programmable character/symbol generator
 - Up to 248 characters/symbols generated in up to 64 sizes
 - Sixteen line types
 - Compatible with 3277GA Vector list
 - Micro-diagnostics for fault detection/isolation at card level
 - User Function Program (UFP) Interpreter: Host-generated UFPs can be loaded to the 7351 where they may be executed to provide a degree of host independence.
- 7352 Color Image Display Station
 - High quality, high resolution monitor
 - Special workstation desk is included for supporting 7352, 7353, keyboard, joystick and user equipment
 - Interface for attachment of user provided color hardcopy (camera) system via coaxial cables

- 7353 Conversational Monitor Display
 - Allows user to control host applications and images displayed on 7352
 - Based on 3278 Model 3 Terminal
 - Includes:
 - Display of 32 lines, 80 characters/line
 - 87-key EBCDIC Typewriter/APL keyboard
 - Joystick controlled by programmable micro controller
 - Interface to optional 5083 model 1 Tablet or 5277 Mouse

Software Requirements:

Host Basic User Subroutines (HBUS): Access to the 7350 is provided via HBUS, a host resident library of subroutines for high-level program interface control of the 7350 Image Processing System. HBUS routines are callable from FORTRAN, PL/I, Assembler, Pascal and other high level programming languages. Program Number 5799-BJQ for VM or 5799-BJP for MVS operating systems.

Customer Responsibilities: The customer is responsible for physical site preparation, the provision of electrical power, and physical planning for the system.

System Environment:

7351 Control Unit Class B - Computer room environment
7352 Display Class C - Normal office environment
7353 Display Class C - Normal office environment

Publications:

<i>7350 Marketing Brochure - General</i>	GK10-6422
<i>Marketing Brochure - Petroleum Industry</i>	G520-3994
<i>Facts Folder</i>	G520-0071
<i>7350 Overview</i>	GA19-5433
<i>Installation Manual - Physical Planning</i>	GA19-5431
<i>7350 Operators Guide</i>	GC19-5115
<i>7350 Systems Operation Reference</i>	SY19-6237
<i>Host Basic User Subroutines - Installation Guide</i>	SH19-6351
<i>Host Basic User Subroutines - Programmer's Guide</i>	SH19-6298
<i>7351 Control Unit Maintenance Information Manual</i>	SY19-6231
<i>7351 Control Unit Parts Catalog</i>	SY19-6233
<i>7352 Color Image Display Station</i>	
<i>Maintenance Information Manual</i>	SY19-6234
<i>7353 Conversational Monitor Station</i>	
<i>Maintenance Information Manual</i>	SY19-6230
<i>7353 Conversational Monitor Station</i>	
<i>Parts Catalog</i>	SY19-6232

SPECIFY

- Power (AC, 1-phase, 3-wire):

For 7351:

50 Hz	60 Hz
200V	208V
240V	240V

For 7352/7353:

50 Hz	60 Hz
100V	100V
110V	110V
220V	120V
240V	127V

Note: Correct voltages will be determined by country.

SPECIAL FEATURES (None)

MODEL CONVERSIONS

7351 models 2 through 6 are field upgradable in 1MB increments to a maximum of six storage buffers (model 1).

ACCESSORIES (None)

SUPPLIES (None)

7361 GRAPHICS PROCESSOR UNIT

(NO LONGER AVAILABLE)

PURPOSE

Provides the logic, memory, disk storage, and I/O control capabilities for the 7361 Fastdraft System. When loaded with the 7361 Fastdraft licensed program, enables and controls user's interaction with the 3251 mdl 2 Display Station and the 7374 or 7375 Color Plotter. As the key element, with the Fastdraft licensed program, of the 7361 Fastdraft System, offers graphics functions for use by drafting personnel untrained and inexperienced in computer or programming disciplines.

MODELS

Model 1 001

Prerequisites: There are no prerequisites for the 7361 GPU. The following elements are, however, required when using the 7361 as part of the 7361 Fastdraft System:

- The 7361 Fastdraft licensed program (5719-GP1).
- A 3251 mdl 2 Display Station with Alphameric Keyboard (#4621) and Light Pen (#4750).
- A system console that can be any announced model of the 3101 Display Terminal, (without 3m (10 ft) modem cable), or an appropriately configured Personal Computer (PC) — where announced.
- Use of the IBM PC as a Fastdraft Console:
 - The system console is used to install the 7361 Fastdraft Licensed Program, for diagnostic tests, and for formatting drawing diskettes.
 - Although the PC must be physically attached to the Fastdraft, powered-on during Fastdraft operation, and perform the functions normally accomplished by the 3101, it may be used for the customer's own purposes when not specifically being used for one of the above three functions. Customers must be notified of these conditions for operation as a Fastdraft console.
 - The following is the minimum configuration of PC required for 3101 emulation on Fastdraft:
 - ▲ 64K of memory in CPU
 - ▲ one diskette drive
 - ▲ one display
 - ▲ Asynchronous communications adapter
 - ▲ Direct cable connect to Fastdraft
 - ▲ Two blank diskettes
 - ▲ 3101 emulation program (6024042)
 - ▲ Disk operating system
 - Cable (P/N 4411751) is shipped with the 7361 ship group to allow the PC attachment. An IBM CE will install the cable on the 7361. The PC is a customer setup unit.

Customer Setup: No.

HIGHLIGHTS

A floor-standing unit mounted on casters for easy installation and service access contains:

- The processor.
- 256K bytes of storage.

- A 13.9 megabyte disk file.
- A diskette drive that can accommodate up to 1.2 megabytes, dependent upon format.
- Workstation controller
- Power supplies.
- A processor control panel.

Cable connects to one or two 3251 mdl 2 Display Stations, to any mdl of the 3101 Display Terminal console (without modem cable), or an appropriately configured PC (see "Prerequisites" above), and to an optional 7374 or 7375 Color Plotter. Provides the logic, storage and I/O control capabilities to handle graphics application functions for drafting personnel.

Description: The 7361 Graphics Processor Unit (GPU), with the Fastdraft licensed program Version 1, Mod 1 installed, offers complete "menus" of functions to the drafter.

Some of these features/functions are:

- Isometric drawing and assembly capabilities.
- Circle/arc intersect and tangent.
- Ability to draw lines tangent to circle/arc.
- User-defined units of measure (millimeters and inches).
- Scalable views.
- Spline.
- Dimensions in decimal inches and angles in degrees, minutes and seconds. Also decimal millimeters and degrees.
- Addressability of eight pen positions.
- Coordinate selection by light-pen and key entry.
- Dynamic read-out of coordinates as the tracking-cross moves.
- (Except Japan > Feet/inch/fraction units to 1/64th-inch.
- Drawing construction at user defined scales.
- Plot merge by view.
- Plotting concurrently with graphic creation at both 3251 mdl 2s.
- Chamfer
- Cross-Hatch option for Pouché' <)

See IBM 7361 Fastdraft Workstation Reference (SC34-0516), and related publications for a full explanation of the functions and features.

Usability: The 7361 user does not need computer or programming background. Users rapidly learn to use the system. Interaction with the logic and controlling application in the 7361 is via a 3251 mdl 2 Display Station equipped with a special keyboard and a light-pen. A training guide steps the user through the functions offered. The screen is analogous to the drafting table. The light-pen acts like a drafting pencil. Disk storage capability in the 7361 permits storage of the drawing in process for rapid access. Diskettes are the loading media for the program product and for drawings written in a previous work session or from other 7361 systems. The user selects the "Options" or functions required from a list of options displayed in menu form on the screen. Prompts direct the user to the next action required. No computer jargon is used. The 7361 has no dependency on host systems attachments or host systems programming support.

Customer Responsibilities: The customer is responsible for site preparation, for the provision of the required electrical service and facilities, and for installation of the 7361 Fastdraft licensed program (5791-GP1).

Installation: The 7361 will be installed by a Customer Engineer.

Physical Specifications

Width - 760mm (29.92 in.)
 Depth - 722mm (28.43 in.)
 Height - 1,525mm (60.04 in.)
 Weight - 250 kg (550 lbs.)

Operating Environment

Temperature - 15 to 32.2 degrees C (60 to 90 degrees F)
Relative Humidity - 8% to 80%
Wet Bulb - 22.8 degrees C (73 degrees F) max.
Altitude - 0 to 2,135 meters (7,000 feet)

Publications:

IBM Fastdraft System Guide (SC34-0514)
IBM Fastdraft Training Guide (SC34-0515)
IBM 7361 Fastdraft Workstation Reference (SC34-0516)

SPECIFY

- Power (AC, 1-phase): Specify as follows:
- #9914 for 240V 60 Hz (available with Canadian English character generator language, #2778, and English US character generator language, #2756, only).
Note: Korea and Taiwan must order #9914/#2756. The 240V setting will be changed in the field at installation time be the CE to 220V as required.
#2801 for 240V 50 Hz (available with English UK character generator language, #2758, only).
Note: Australia, Hong Kong, New Zealand, and Singapore must order #2801. The 240V setting will be changed in the field (if appropriate) by the CE to 200V or 230V as required.
(Japan only>#2806 for 200V 50 Hz, #2732 for 200V 60 Hz (available with Japanese character generator language #2773 only). <)
- Power Cord Length: 1.8m (6 ft).
- Power Plug: The appropriate plug will be provided/installed by the CE at installation time.
- Character Generator Language: **Note:** Character Generator Language specification also provides machine nomenclature in the language specified. Specification of Power and Character Generator Language results in the configuration shown below.

Specify #2758 for English UK.

7361 GPU Configuration	UK
Char Generator Operator Panel	English UK English US

Safety Labels	English US
Voltage	240V 50 Hz

(Japan only> Specify #2773 for Japanese.

7361 GPU Configuration	Japan
Char Generator Operator Panel Safety Labels Voltage	Japanese Japanese Japanese 200V 50/60 Hz<)

(Canada only> Specify #2778 for Canadian English (provides English US character generator language and Canadian Bilingual Labels).

7361 GPU Configuration	Canada
Char Generator Operator Panel Safety Labels Voltage	English US English US English/French 240V 60 Hz<)

Specify #2756 for English US.

7361 GPU Configuration	Canada
Char Generator Operator Panel Safety Labels Voltage	English US English US English US 240V 60 Hz

Note: The 7361 Character Generator Language must be consistent with the 3251 mdl 2 Keyboard Language.

The exception is #2956 on 3251 mdl 2 which can correlate to #2778 on 7361 GPU for English US as well as for (Canada only> Canadian English. <)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

Diskettes: Available from IBM.

7371 COLOR PLOTTER**PURPOSE**

The 7371 is a 2-pen, desk-top, multicolor, multimedia, high-resolution vector plotter. It provides the capability to plot A/A4 size drawings on paper or transparency film with accurate registration and repeatability. The 7371 connects via cable to the S/370, 43XX and 30XX via the 3179 Mdl G, 3192 Mdl G, 3277 Graphics Attachment (with RPQ 7H0284), 5085 Graphics Processor Unit, 3270 PC Attachment, XT/370 PC, 3270 PC, 3270-PC/G, 3270-PC/GX, Personal Computer XT, Personal Computer Expansion Unit, S/34 or S/36 (using 5292-2). Attachment is via cable purchased from IBM (see "Special Features").

MODELS**Model 1 001**

Prerequisite Operating Environment: Programming Support: The 7371 is supported on the following systems with programs listed:

- 3277 Graphics Attachment, 3179 Mdl G, 3192 Mdl G, and Host-connected PC based products (PC, PC XT, PC XT/370, 3270 PC, 3270-PC/G and 3270-PC/GX):
 - Industry Standard Plotting Commands (5796-BDZ)
 - Interactive Presentation Graphics (IPG) Rel 1.2 (5798-DJT) running under VS APL (5748-AP1) and VM/SP (5665-167)
 - Color Plotter support for the GDDM Graphics Data File (5668-860)
- 5085 Graphics Processor:
 - Industry Standard Plotting Commands (5796-BDZ)
- Personal Computer: The following are typical licensed programs that support the 7371 under DOS 1.1 or higher:
 - BPS Business Graphics(R)* (#9280, P/N 6871470)
 - 1-2-3(R)** (#9047, P/N 6871325)
 - Fast Graphs(R)*** (#9118, P/N 6871362)
 - IBM Graphing Assistant (#4147, P/N 6024147)

* Business Graphics is a trademark of Business and Professional Software Inc.

** 1-2-3 is a trademark of Lotus Development Corp.

*** Fast Graphics is a trademark of Innovative Software Inc.
- S/34: Business Graphics Utilities - PRPQ P84062 (5799-BTA)
- S/36: Business Graphics Utilities - Release 2 PRPQ P84056 (5799-BNW)

Attachment: The 7371 attaches to a EIA Standard RS-232-C port or a IEEE-488 standard port via a cable. Variations in connectors are determined by specify codes. Remote attachment is not supported.

Customer Setup (CSU): The 7371 has been designated as a CSU machine.

HIGHLIGHTS

Provides ability to plot A/A4 size 210 x 297mm (8.5 x 11 in).

The 7371 is a 2-pen plotter which allows the operator to stop the plotting to change pen color or line widths to match application requirements.

Two pen types are handled:

- Fiber tip for paper

Line Widths: 0.3 or 0.7mm

Colors: Black, Red, Green, Blue, Burnt Orange, Lime Green, Gold, Turquoise, Violet or Brown

- Fiber tip for transparency film (hard wearing)

Line Widths: 0.3 or 0.6mm

Colors: Black, Red, Green, Blue, Orange, Brown or Violet

Pens are automatically capped when in holders to retard pen drying problems and increase the life of the pens.

Paper or transparency film can be selected as the drawing media where required by the application.

Precise media control yields excellent line quality.

Simple and convenient push button control is designed into the plotter.

Maximum Pen Speed: Pen down, 38.1cm/sec (15.0 in./sec); Pen up 50.8cm/sec (20.0 in./sec).

Acceleration -- approximately 2 g's.

Resolution -- 0.025mm (0.001 in.).

Repeatability with given pen 0.1mm (0.004 in.), from pen to pen 0.2mm (0.008 in.).

Physical Specifications:

Width - 431.8mm(17.0 in) Carton 22.0 in.
Depth - 342.9mm(13.5 in) Carton 17.75 in.
Height- 127.0mm(5.0 in) Carton 16.0 in.
Weight- 6.14kg(13.5 lbs) Net
10.23kg(22.5 lbs) Shipping Gross

Environmental Specifications:**Operating:**

Temperature - 10 to 40.6 degrees C (50 - 105 degrees F)
Relative Humidity - 8 to 80 percent
Max Wet Bulb - 26.7 degrees C (80 degrees F)
Altitude - 2,135m (7,000 ft) max

Non-Operating:

Temperature - 10 to 51.7 degrees C (50 to 125 degrees F)
Relative Humidity - 8 to 80 percent
Max Wet Bulb - 26.7 degrees C (80 degrees F)

Shipping:

Temperature - -40 to 60 degrees C (-40 to 140 degrees F)
Relative Humidity - 5 to 100 percent
Max Wet Bulb - 0.6 to 29.4 degrees C (33 to 85 degrees F) No Condensation

Maintenance: Offerings are available through Customer Engineering.

Publications:

- Color Brochure - 7371 and 7372 Color Plotters Quality Graphics at an affordable price, G520-1096
- Proposal Insert, G221-2461
- One publication will be shipped with this plotter: "IBM 7371 Color Plotter Guide to Operations". Note: This manual is available in English, French, German, Italian, Japanese and Spanish.
- Additionally, IBM 7371 Color Plotter Programming will be available as feature code #5060. Note: This manual is available in English only.

Education: No formal education is planned.

SPECIFY

- Power: 100V AC, 120V AC, 220V AC, 240V AC - all voltages are 1-phase, 3-wire, 48-66 Hz, 30 Watts maximum. Note: Grounded receptacle required for all voltage levels.
- Interface (select one): #9910 for RS-232-C, #9920 for IEEE-488.
- System Attachment (select one): #9930 if purchased for attachment to systems that include other IBM hardware and/or software products. #9940 if purchased for attachment to non-IBM systems that do not include other IBM hardware and/or software products.
- Languages: Country Code will be used to determine Nomenclature and documentation language shipped.

Customer-installed language customizing is accomplished by stick on overlays for the paper load label and snap in overlays for nomenclature on the control panel.

Documentation is available in English, French, German, Spanish, Japanese and Italian. One set of documents (i.e., one language) is supplied with each plotter. Programming manuals will be available in English only. Default language group for countries requiring specify code for language selection will be English.

Country	Power 48-66 Hz	Languages Nomen- clature	Guide to Ops.
Argentina	220V	Eng/Span	Span
Australia	240V	Eng	Eng
Brazil	120V	Eng/Port	Eng
Canada			
#2924	120V	Eng	Eng
#2928	120V	Eng/Fr	Fr
Chile	220V	Eng/Span	Span
Colombia	120V	Eng/Span	Span
Costa Rica	120V	Eng/Span	Span
Ecuador	120V	Eng/Span	Span
Guatemala	120V	Eng/Span	Span
Honduras	110V	Eng/Span	Span
Hong Kong	220V	Eng	Eng
Indonesia	220V	Eng	Eng
Japan	100V	Eng/Jap	Jap
Korea	100V	Eng	Eng
Malaysia	240V	Eng	Eng
Mexico	120V	Eng/Span	Span
New Zealand	240V	Eng	Eng
Panama	120V	Eng/Span	Span
Peru	220V	Eng/Span	Span
Singapore	240V	Eng	Eng
Taiwan	120V	Eng/Fr	Eng
Venezuela	120V	Eng/Span	Span

Note: Safety approval, where required by countries in the above table, is in process.

Countries not listed above will be handled on an exception basis and will be limited to available power supplies, plugs, safety label and document translations. The plotters will not have been tested or approved for use in countries other than those listed.

SPECIAL FEATURES

Cables: One power cord is shipped with the plotter. One interface cable for each plotter purchased may be ordered using the feature codes shown below when ordering plotters. Additional cables, if required, may be ordered by part number from ISSD.

Code	Part Number	
#5020	2719979	RS-232-C cable for 5085 or 3277GA
#5030	2719931	RS-232-C cable for PC, PC/XT, XT/370, 3270-PC and PC Expansion units
#5040	2720020	For IEEE-488 Interface for 3179 Mdl G, 3192 Mdl G
#5050	6216997	RS-232-C cable for PC, PC/XT, XT/370 and PC Expansion units

Note: The IEEE-488 adapter on 3270-PC/G or 3270-PC/GX includes a cable for plotter attachment (purchase of cable is not required if only one plotter is attached). Additional plotters may be attached to the same IEEE-488 adapter (one cable Feature Code #5040 is required for each additional Plotter).

For the 3270 PC AT/G and AT/GX, the IEEE cable is not included. Therefore #5040 (P/N 2720020) is required for each attachment.

Publications: "IBM 7371 Color Plotter Programming" will be available as feature code #5060.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

A starter kit of commonly used supplies is provided with each plotter to enable the user to utilize the 7371 upon receipt. Included are pens for plotting on paper, plotting paper and an AC line power cord.

Supplies and Cables: Can be ordered through normal country procedures.

Note: See "Special Features" for information on ordering cables.

7372 COLOR PLOTTER**PURPOSE**

The 7372 is a 6-pen, desk-top, multicolor, multimedia, high-resolution vector plotter. It provides the capability to plot A/A4 or B/A3 size drawings on paper or transparency film with accurate registration and repeatability. The 7372 connects via cable to the S/370, 43XX and 30XX via the 3179 Mdl G, 3192 Mdl G, 3277 Graphics Attachment (with RPQ 7H0284), 5085 Graphics Processor Unit, 3270 PC Attachment, XT/370 PC, 3270 PC, 3270-PC/G, 3270-PC/GX, Personal Computer XT, Personal Computer AT, 3270-PC AT, 3270-PC AT/G, 3270-PC AT/GX, Personal Computer Expansion Unit, S/34, S/36 or S/38 (using 5292-2). Attachment is via cable purchased from IBM (see "Special Features").

MODELS**Model 1 001**

Prerequisite Operating Environment: Programming Support: The 7372 is supported on the following systems with programs listed:

- 3277 Graphics Attachment, 3179 Mdl G, 3192 Mdl G, and Host-connected PC based products (PC, PC XT, PC XT/370, 3270 PC, 3270-PC/G and 3270-PC/GX):
 - Industry Standard Plotting Commands (5796-BDZ)
 - Interactive Presentation Graphics (IPG) Rel 1.2 (5798-DJT) running under VS APL (5748-AP1) and VM/SP (5665-167)
 - Color Plotter support for the GDDM Graphics Data File (5668-860)
- 5085 Graphics Processor:
 - Industry Standard Plotting Commands (5796-BDZ)
- Personal Computer: The following are typical licensed programs that support the 7372 under DOS 1.1 or higher:
 - BPS Business Graphics((R))* (#9280, P/N 6871470)
 - 1-2-3(R)** (#9047, P/N 6871325)
 - Fast Graphs(R)*** (#9118, P/N 6871362)
 - IBM Graphing Assistant (#4147, P/N 6024147)

* Business Graphics is a trademark of Business and Professional Software Inc.

** 1-2-3 is a trademark of Lotus Development Corp.

*** Fast Graphics is a trademark of Innovative Software Inc.
- S/34: Business Graphics Utilities - PRPQ P84062 (5799-BTA)
- S/36: Business Graphics Utilities - Release 2 PRPQ P84056 (5799-BNW)
- S/38: Business Graphics Utilities (5714-GP1)

Attachment: The 7372 attaches to a EIA Standard RS-232-C port or a IEEE-488 standard port via a cable. Variations in connectors are determined by specify codes. Remote attachment is not supported.

Customer Setup (CSU): The 7372 has been designated as a CSU machine.

HIGHLIGHTS

Provides ability to plot A/A4 size 210 x 297mm (8.5 x 11 in.) or B/A3 size 297 x 420mm (11 x 17 in.) drawings.

The 7372 is a 6-pen plotter that allows programmable selection from a carousel of pens, colors or line widths to match application requirements.

Two pen types are handled:

- Fiber tip for paper
 - Line Widths: 0.3 or 0.7mm
 - Colors: Black, Red, Green, Blue, Burnt Orange, Lime Green, Gold, Turquoise, Violet or Brown
- Fiber tip for transparency film (hard wearing)
 - Line Widths: 0.3 or 0.6mm
 - Colors: Black, Red, Green, Blue, Orange, Brown or Violet

Pens are automatically capped when in holders to retard pen drying problems and increase the life of the pens.

Paper or transparency film can be selected as the drawing media where required by the application.

Precise media control yields excellent line quality.

Simple and convenient push button control is designed into the plotter.

Maximum Pen Speed: Pen down, 38.1cm/sec (15.0 in./sec); Pen up 50.8cm/sec (20.0 in./sec).

Acceleration -- approximately 2 g's.

Resolution -- 0.025mm (0.001 in.).

Repeatability with given pen 0.1mm (0.004 in.) from pen to pen 0.2mm (0.008 in.).

Physical Specifications:

Width	-	571.5mm (22.5 in.)
		Carton 27.0 in.
Depth	-	368.3mm (14.5 in.)
		Carton 19.0 in.
Height	-	127.0mm (5.0 in.)
		Carton 16.0 in.
Weight	-	6.82kg (15.0 lbs)
		12.7kg (28.0 lbs)
		Net Shipping Gross

Environmental Specifications:**Operating:**

Temperature - 10 to 40.6 degrees C (50 to 105 degrees F)
Relative Humidity - 8 to 80 percent
Wet Bulb - 26.7 degrees C (80 degrees F)
Altitude - 2,135m (7,000 ft) maximum

Non-Operating:

Temperature - 10 to 51.7 degrees C (50 to 125 degrees F)
Relative Humidity - 8 to 80 percent
Wet Bulb - 26.7 degrees C (80 degrees F)

Shipping:

Temperature - -40 to 60 degrees C (-40 to 140 degrees F)
Relative Humidity - 5 to 100 percent
Wet Bulb - 0.6 to 29.4 degrees C (33 to 85 degrees F) No Condensation

Maintenance: Offerings are available through Customer Engineering.

Publications:

Color Brochure - 7371 and 7372 Color Plotters Quality Graphics at an Affordable Price (G520-1096)

Proposal Insert (G221-2461)

One publication will be shipped with this plotter: IBM 7372 Color Plotter Guide to Operations. Note: This manual is available in English, French, German, Italian, Japanese and Spanish.

Additionally, IBM 7372 Color Plotter Programming will be available as feature code #5060. Note: This manual is available in English only.

Education: No formal education is planned.

SPECIFY

- Power: 100V AC, 120V AC, 220V AC, 240V AC - all voltages are 1-phase, 3-wire, 48-66 Hz, 30 Watts maximum. Note: Grounded receptacle required for all voltage levels.
- Interface (select one): #9910 for RS-232-C, #9920 for IEEE-488.
- System Attachment (select one): #9930 if purchased for attachment to systems that include other IBM hardware and/or software products. #9940 if purchased for attachment to non-IBM systems that do not include other IBM hardware and/or software products.
- Languages: Country Code will be used to determine Nomenclature and documentation language shipped.

Customer-installed language customizing is accomplished by stick on overlays for the paper load label and snap in overlays for nomenclature on the control panel.

Documentation is available in English, French, German, Spanish, Japanese and Italian. One set of documents (i.e., one language) is supplied with each plotter. Programming manuals will be available in English only. Default language group for countries requiring specify code for language selection will be English.

Guide to	Languages		Country	Power
	48-66 Hz	Nomenclature		
Argentina	220V	English/Spanish	Spanish Australia	
240V	English	English Brazil	120V	
English/Portuguese	English Canada	English	English	
#2924	120V	English	English	
#2928	120V	English/French	French Chile	220V
English/Spanish	Spanish Colombia	120V		
English/Spanish	Spanish Costa Rica	120V		
English/Spanish	Spanish Ecuador	120V		
English/Spanish	Spanish Guatemala	120V		
English/Spanish	Spanish Honduras	110V		
English/Spanish	Spanish Hong Kong	220V	English	
English Indonesia	220V	English	English Japan	
100V	English/Japanese	Japanese Korea	100V	
English	English Malaysia	240V	English	
English Mexico	120V	English/Spanish	Spanish New	
Zealand	240V	English	English Panama	120V
English/Spanish	Spanish Peru	220V		
English/Spanish	Spanish Singapore	240V	English	
English Taiwan	120V	English/French	English	
Venezuela	120V	English/Spanish	Spanish	

Note: Safety approval, where required by countries in the above table, is in process.

Countries not listed above will be handled on an exception basis and will be limited to available power supplies, plugs, safety label and document translations. The plotters will not have been tested or approved for use in countries other than those listed.

SPECIAL FEATURES

Cables: One interface cable for each plotter purchased may be ordered using the feature codes shown below when ordering plotters. Additional cables, if required, may be ordered by part number from ISSD.

Code	Part Number	
#5020	2719979	RS-232-C cable for 5085 or 3277GA
#5030	2719931	RS-232-C cable for PC, PC/XT, XT/370, 3270-PC and PC Expansion units.
#5040	2720020	For IEEE-488 Interface for 3179 Mdl G, 3192 Mdl G,
#5050	6216997	RS-232-C cable for PC, PC/XT, XT/370 and PC Expansion units.

Note: The IEEE-488 adapter on 3270-PC/G or 3270-PC/GX includes a cable for plotter attachment (purchase of cable is not required if only one plotter is attached). Additional plotters may be attached to the same IEEE-488 adapter (one cable Feature Code #5040 is required for each additional plotter).

For the 3270 PC AT/G and AT/GX, the IEEE cable is not included. Therefore #5040 (P/N 2720020) is required for each attachment.

Publications: IBM 7372 Color Plotter Programming will be available as feature code #5060.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES

A starter kit of commonly used supplies is provided with each plotter to enable the user to utilize the 7372 upon receipt. Included are pens for plotting on paper, plotting paper and an AC line power cord.

Supplies and Cables: Can be ordered through normal country procedures.

Note: See "Special Features" for information on ordering cables.

7374 COLOR PLOTTER

PURPOSE

The 7374 is a floor-standing, multicolor, multimedia, high-resolution vector plotter. It provides the capability to plot up to D/A1 size drawings on paper, vellum, or polyester sheets with highly accurate registration and repeatability. The 7374 connects via cable to the S/370, 43XX and 30XX via the 3255 Display Control Unit (with RPQ 7J0071 or RPQ 7J0072), 3277 Graphics Attachment (with RPQ 7H0284), 5085 Graphics Processor Unit, IBM Personal Computer (PC), 3270-PC, 3270-PC Attachment Feature, PC/XT, PC XT/370, PC Expansion Units, 3270 PC/G, 3270 PC/GX, and the 7361 Fastdraft System. Attachment is via cable supplied by IBM with the base unit as defined by specify codes except for the Fastdraft System which supplies the cable as part of the 7361 Fastdraft Controller. This plotter features a switchable RS-232-C/Parallel Interface Adapter.

MODELS

Model 1 001

Prerequisite Operating Environment: The 7374 attaches to an EIA RS-232-C port or an IEEE 488 standard port in the 7361 via a 3.0 meter (10 ft) cable. Variations in connectors and shipping vehicles are determined by specify codes.

The IBM color plotters are supported on the following systems with programs listed:

- 3255 Display Control:
 - Industry Standard Plotting Commands (5796-BDZ) running under:
 - MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167) with GAM/SP1 (5668-978).
 - 3277 Graphics Attachment:
 - Industry Standard Plotting Commands (ISPC) 5796-BDZ: ISPC requires PRPQ P0913 (5799-AAX) and one of the following operating systems;
 - MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167).
 - Interactive Presentation Graphics (IPG) Release 1.2 (5798-DJT) running under VM/SP Release 1.2 (5664-167):
 - IBM Color Plotter support for GDDM.
 - 5085 Graphics Processor:
 - Industry Standard Plotting Commands (ISPC) (5796-BDZ):
 - MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167) with GAM/SP1 (5668-978).
 - 7361 Fastdraft System:
 - IBM 7361 Fastdraft Licensed Program (5719-GP1)
- (Canada only+)
- IBM Personal Computer: The following are typical IBM Licensed Programs that support the 7374 under DOS 1.1:
 - Industry Standard Plotting Commands (5796-BDZ)
 - BPS Business Graphics® (6871470, #9280)
 - Lotus 1-2-3® (6871289, #9047)
 - IBM Color Plotter support for GDDM (5668-860) +)

For further information on the use of the 7374 plotter with the Fastdraft System, see the *IBM Fastdraft System Guide* (SC34-0514-1).

HIGHLIGHTS

- Provides ability to plot up to D/A1 size drawings 594mm x 841mm (22 in. x 34 in.). Other standard size drawings that can be accommodated are:

A 8-1/2 x 11 in.	A4 210 x 297mm
B 11 x 17 in.	A3 297 x 420mm
C 17 x 22 in.	A2 420 x 594mm

- The 7374 is an 8-pen plotter that allows the drafter to choose pens, colors and line widths to match application requirements.
- Three pen types are handled:
 - Fiber Tip (inexpensive, choice of widths, wear quality, etc.)
 - Roller Ball (fine lines, fast drawing, long wearing)
 - Liquid ink drafting pens (highest quality for final work)
- Each pen type has its own 8-pen carousel and the three carousels are manually interchangeable.
- Pen speeds and force will automatically be set to default values appropriate for "just loaded" pen types whenever the carousel is changed.
- Automatic pen-capping is provided to retard drying and to increase pen life.
- Paper, vellum, or double-matte polyester sheets can be selected as the drawing media as application requires.
- Media size ranges are:

Width	267mm (10.5 in.) to 298mm (11.75 in.), that include standard sizes A4/A and A3/B; and 546mm (21.5 in.) to 622.3mm (24.5 in.), which includes standard sizes A2/C, A1/D.
Length	203mm (8 in.) to 1,231.9mm (48.5 in.)
- Paper size is electronically sensed to establish plot limits.
- Ultra-precise media control yields superior repeatability and accuracy.
- Simple and convenient pushbutton control is designed into the plotter.
- The 7374 offers two switch-selectable standard interfaces: IEEE 488-1978 and RS-232-C/CCITT V.24 asynchronous ASCII with switch-selectable rates of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 7200, and 9600.
- Resolution at the smallest addressable step size is 0.025 millimeters (0.001 in.).
- Speed, independent of vector direction is 60 centimeters per second (24 in. per second).
- Acceleration is 4G maximum.
- Repeatability for a given pen is 0.05 millimeters (0.002 in.).
- Power requirements are:
 - Source, 100, 120, 220, 240V, -10%, +5%
 - Frequency, 48 - 66 Hz
 - Consumption, 182W maximum

Customer Responsibilities: The customer is responsible for site preparation and for providing appropriate power facilities.

Installation: The 7374 will be installed by an IBM Customer Service Representative when attached to the 7361 Fastdraft System. All other installations will be done by the IBM Customer Engineering Division.

Physical Specifications:

Width	1,087mm (42.8 in.)
Depth	557mm (21.9 in.)
Height	1,188mm (46.8 in.)
Weight	59kg (130 pounds)

Environmental Specifications:

Operating:	
Temperature	10 to 40.6 degrees C (50 to 105 degrees F)
Relative Humidity	8% to 80%
Max Wet Bulb	26.7 degrees C (80 degrees F)
Altitude	2,135m (7,000 ft) Maximum
Non-Operating:	
Temperature	10 to 51.7 degrees C (50 to 125 degrees F)
Relative Humidity	8% to 80%
Max Wet Bulb	26.7 degrees C (80 degrees F)

Shipping:	
Temperature	-40 to 60 degrees C (-40 to 140 degrees F)
Relative Humidity	5% to 100%
Max Wet Bulb	29.4 degrees C (85 degrees F) No Condensation

7374 Color Plotter (cont'd)
Publications:

1. Four publications will be shipped with the 7374:
 - *IBM 7374 Color Plotter Maintenance Information Manual* (SY34-0315)
 - *IBM 7374 Color Plotter Parts Catalog* (SI34-0106)
 - *IBM 7374 and 7375 Color Plotter Operations and Problem Determination* (GA23-0160)
 - *IBM 7374 and 7375 Color Plotter Programming* (GA23-0161)
2. General Fastdraft information:
 - *IBM Fastdraft System Guide* (SC34-0514)
 - *IBM Fastdraft Training Guide* (SC34-0515)
 - *IBM Fastdraft Workstation Reference* (SC34-0516)
3. Education: (Self Study Guide)
 - *IBM 7361 Fastdraft Training Guide* (SC34-0515)

SPECIFY

- Power (AC, 1-phase, 3-wire, 48-66 Hz): Voltages are +5%, -10%. Specify as follows:
#2813 for 220V or **#2801** for 240V (available with the following machine nomenclature only):

English UK #2927	Italian #2932
French #2928	Spanish #2931
German #2929	

Note: Korea must order **#9911** for 120V. The voltage setting will be changed in the field at installation time by the CE as required.

#9911 for 120V (available with the following machine nomenclature only):

Canadian English #2934*	German #2929
English UK #2927	Italian #2932
English US #2928	Spanish #2931
French #2928	

#2730 for 100V (available with Japanese **#2930** 7374 machine nomenclature only).
- Machine Nomenclature: Including operator panel. Plant installation only.

Canadian English #2934*	English US #2924
English UK #2927	Japanese #2930

* Provides English nomenclature, and Canadian Bilingual Safety and CSA Certification labels.

SPECIAL FEATURES

Cable (#5010): For Fastdraft attachment (cable shipped with the machine).

Cable (#5020): RS-232-C for 5085, 3277GA, or 3255.

Cable (#5030): RS-232-C cable for all PC, PC XT, XT/370, PC expansion units, and 3270 PC.

Cable (#5040): For all IEEE 488 Interface Attachments. **Note:** The IEEE 488 adapter on 3270-PC/G or 3270-PC/GX includes a cable for plotter attachment (therefore purchase of cable is not required if plotter is the only device to be attached). Additional devices may be attached to the same IEEE 488 adapter (one cable feature code **#5040** is required for each additional device).

MODEL CONVERSIONS (None)
ACCESSORIES (None)
SUPPLIES

Supplies will be available from IBM.

7375 COLOR PLOTTER

PURPOSE

The 7375 is a floor-standing, multicolor, multimedia, high-resolution vector plotter. It provides the capability to plot up to E/AO size drawings on paper, vellum, or polyester sheets with highly accurate registration and repeatability. The 7375 Mdl 2 has the added capability of utilizing roll media for high volume, continuous feed and long axis plotting. The 7375 connects via cable to the S/370, 43XX and 30XX via the 3255 Display Control Unit (with RPQ 7J0071 or RPQ 7J0072), 3277 Graphics Attachment (with RPQ 7H0284), 5085 Graphics Processor Unit, (Canada only) Personal Computer, <) IBM Personal Computer (PC), 3270-PC, 3270-PC Attachment Feature, PC/XT, PC XT/370, PC Expansion Units, PC AT, PC AT/370, 3270 PC/G, 3270 PC/GX, and the 7361 Fastdraft System. Attachment is via cable supplied by IBM with the base unit as defined by specify codes except for the Fastdraft System which supplies the cable as part of the 7361 Fastdraft Controller. This plotter features a switchable RS-232-C/Parallel Interface Adapter.

MODELS 1, 2

Model 1 001

Prerequisite Operating Environment: The 7375-1 attaches to an EIA RS-232-C port or an IEEE-488 standard port in the 7361 via a 3.0m (10 ft) cable. Variations in connectors and shipping vehicles are determined by specify codes.

The 7375-1 is supported on the following systems with programs listed:

- 5085 Graphics Processor:
 - Industry Standard Plotting Commands (ISPC) (5796-BDZ):
 - MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167) with GAM/SP1 (5668-978).
- 3255 Display Control:
 - Industry Standard Plotting Commands (5796-BDZ) running under:
 - MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167) with GAM/SP1 (5668-978).
- 3277 Graphics Attachment:
 - Industry Standard Plotting Commands (ISPC) 5796-BDZ: ISPC requires PRPQ P0913 (5799-AAX) and one of the following operating systems; MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167).
 - Interactive Presentation Graphics (IPG) Release 1.2 (5798-DJT) running under VM/SP Release 1.2 (5664-167):
- IBM Color Plotter support for GDDM/GDF (5668-860)
- 7361 Fastdraft System:
 - IBM 7361 Fastdraft Licensed Program (5719-GP1)
- (Canada only) IBM Personal Computer: The following are typical IBM Licensed Programs that support the 7375 under DOS 1.1:
 - IBM SlideWrite (6317034, 5875-EEE, #7034)
 - Interactive Presentation Graphics (5798-DJT)
 - Industry Standard Plotting Commands (5796-BDZ)

- IBM Color Plotter support for GDDM/GDF (5668-860) <)

For further information on the use of the 7375 plotter with the Fastdraft System, see the IBM Fastdraft System Guide (SC34-0514-1).

Model 2 002

Prerequisite Operating Environment: The 7375-2 attaches to an EIA RS-232-C or an IEEE-488 standard port. Variations in connectors and shipping vehicles are determined by specify codes.

The 7375-2 is supported on the following systems with programs listed:

- 5085 Graphics Processor:
 - Industry Standard Plotting Commands (ISPC) (5796-BDZ):
 - MVS Release 3.8 (5752-VS2),
 - VS1 Release 7.0 (5652-VS1),
 - VM/SP Release 1.2 (5664-167) with GAM/SP1 (5668-978).
- (Canada only) The IBM Personal Computer: The following are typical IBM Licensed Programs that support the 7375-2 under DOS 1.1:
 - IBM SlideWrite (6317034, 5875-EEE, #7034)
 - Industry Standard Plotting Commands (5796-BDZ)
 - IBM Color Plotter Support for GDDM/GDF (5668-860)
 - Interactive Presentation Graphics (5798-DJT <)

HIGHLIGHTS

- Provides ability to plot up to E/AO size drawings 841mm x 1,189mm (34 in. x 44 in.) using single sheet media. Other standard size drawings that can be accommodated are:

A	8-1/2 x 11 in.	A4	210 x 297mm
B	11 x 17 in.	A3	297 x 420mm
C	17 x 22 in.	A2	420 x 594mm
D	22 x 34 in.	A1	594 x 841mm
- The 7375-2 has the added capability of utilizing roll media for high volume, continuous feed and long axis plotting.
- The 7375 is an 8-pen plotter that allows the drafter to choose pens, colors and line widths to match application requirements.
- Three pen types are handled:
 - Fiber Tip (inexpensive, choice of widths, wear quality, etc.)
 - Roller Ball (fine lines, fast drawing, long wearing)
 - Liquid ink drafting pens (highest quality for final work)
- Each pen type has its own 8-pen carousel and the three carousels are manually interchangeable.
- Pen speeds and force will automatically be set to default values appropriate for "just loaded" pen types whenever the carousel is changed.
- Automatic pen-capping is provided to retard drying and to increase pen life.
- Paper, vellum, or double-matte polyester sheets can be selected as the drawing media as application requires.
- Paper, vellum and double-matte polyester film roll media are available for use with the 7375-2 in 24 and 36 in. widths. Each roll is 150 ft. long.
- Media size ranges are:
 - Width

267mm (10.5 in.) to 298mm (11.75 in.), that include standard sizes A4/A and A3/B; and 546mm (21.5 in.) to 927mm (36.5 in.), which includes standard sizes A2/C, A1/D, A0/E, and architectural size E.

Length

Single Sheet 203mm (8 in.) to 1,231.9mm (48.5 in.); Roll Media (7375-2 only); Long axis plots are possible by programatically increasing plot margins.

Paper size is electronically sensed to establish plot limits.

- Ultra-precise media control yields superior repeatability and accuracy.
- Simple and convenient pushbutton control is designed into the plotter.
- The 7375 offers two switch-selectable standard interfaces: IEEE-488-1978 and RS-232-C/CCITT V.24 asynchronous ASCII with switch-selectable rates of 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 7200, and 9600.
- Resolution at the smallest addressable step size is 0.025 millimeters (0.001 in.).
- Speed, independent of vector direction is 60 centimeters per second (24 in. per second).
- Acceleration is 4G maximum.
- Repeatability for a given pen is 0.05 millimeters (0.002 inches).
- Power requirements are:

Source, 100, 120, 220, 240V, minus 10 percent, plus 5 per cent
Frequency, 48 - 66 Hz
Consumption, 182W maximum

Customer Responsibilities: The customer is responsible for site preparation and for providing appropriate power facilities.

Installation: The 7375 will be installed by an IBM Customer Service Representative when attached to the 7361 Fastdraft System. All other installations will be done by the IBM Customer Engineering Division.

Physical Specifications:

Width 1,392mm (54.8 in.)
Depth 557mm (21.9 in.)
Height 1,188mm (46.8 in.)
Weight 70.4kg (155 lbs.)
for the 7375-1
86.4kg (190 lbs.)
for the 7375-2

Environmental Specifications:

Operating:
Temperature 10 to 40.6 degrees C
(50 to 105 degrees F)
Relative Humidity 8 per cent to
80 per cent
Max Wet Bulb 26.7 degrees C
(80 degrees F)
Altitude 2,135 meters
(7,000 ft) Maximum

Non-Operating:
Temperature 10 to 51.7 degrees C
(50 to 125 degrees F)
Relative Humidity 8 per cent to
80 per cent
Max Wet Bulb 26.7 degrees C
(80 degrees F)

Shipping:

Temperature -40 to 60 degrees C
(-40 to 140 degrees F)
Relative Humidity 5 per cent to
100 per cent
Max Wet Bulb 29.4 degrees C
(85 degrees F)
No Condensation

Publications:

- Four publications will be shipped with the 7375:

"IBM 7374/7375 Color Plotter Maintenance Information" (SY27-2574)
"IBM 7374/7375 Color Plotter Parts Catalog" (S126-0050)
"IBM 7374/7375 Color Plotter Operations and Problem Determination" (GA23-0160)
"IBM 7374/7375 Color Plotter Programming" (GA23-0161)

- General Fastdraft information:

"IBM Fastdraft System Guide" (SC34-0514)
"IBM Fastdraft Training Guide" (SC34-0515)
"IBM Fastdraft Workstation Reference" (SC34-0516)

- Education: (Self Study Guide)

"IBM 7361 Fastdraft Training Guide" (SC34-0515)

SPECIFY

- Base Machine Nomenclature is English US #2924, with exception of 100V Japanese Machine.
- Power (AC, 1-phase, 3-wire, 48-66 Hz): Voltages are plus 5 per cent, minus 10 per cent. Specify as follows:

#2813 for 220V or #2801 for 240V (available with the following machine nomenclature only):

English US #2924
French #2928
German #2929
Italian #2932
Spanish #2931

#9911 for 120V (available with the following machine nomenclature only):

English US #2924
French #2928
German #2929
Italian #2932
Spanish #2931

- Note: Korea must order #9911 for 120V. The voltage setting will be changed in the field at installation time by the CE as required.

#2730 for 100V (available with Japanese #2930 7375 machine nomenclature only).

- Machine Nomenclature: Including operator panel. Plant installation only.

English US #2924
Japanese #2930

SPECIAL FEATURES

Cable (#5010): For Fastdraft attachment (cable shipped with the machine).

MACHINES

Cable (#5020): RS-232-C for 5085, 3277GA, or 3255.

Cable (#5030): RS-232-C cable for all PC, PC XT, PC XT/370, 3270 PC, PC AT, PC AT/370 and PC expansion units.

Note: A Serial Adapter Connector (6450242, #1242) is also required on the PC AT and PC AT/370.

Cable (#5040):

For all IEEE-488 Interface Attachments. Note: The IEEE-488 adapter on 3270-PC/G or 3270-PC/GX includes a cable for plotter attachment (therefore purchase of cable is not required if plotter is the only device to be attached). Additional devices may be attached to the

same IEEE-488 adapter (one cable feature code #5040 is required for each additional device).

MODEL CONVERSIONS (None)

ACCESSORIES (None)

SUPPLIES

Supplies will be available from IBM.

7426 TERMINAL INTERFACE UNIT

PURPOSE

An ASCII to SDLC protocol converter for attachment of 3101 display units and TTY compatible terminals to the S/370, 43XX, 30XX processors and the 8100 System.

MODELS 1, 2

Model 1 001: Designed for connection to the 8100 and 4331 systems via a direct-attached or data link-attached loop.

Model 2 002: Designed for connection to the S/370, 43XX, 30XX or 8100 systems via SDLC communication link.

Prerequisites: The 7426 requires a downstream microcode load from the host processor to which it communicates. Therefore, the downstream load microcode data set (distributed via magnetic media) must be installed on the host processor.

When connected to the 8100 Processor, the 7426 operates under DPPX or DPCX using the same programming support as provided for the 3276 mdl 12. The 7426 cannot be used for installation of DPPX/DPCX programming system in lieu of the 3276.

When connected to the S/370, 43XX or 30XX processors, the 7426 requires the Downstream Load Utility program product (5668-006) to be installed on the processor.

Customer Setup (CSU): The 7426 is designated a customer setup machine. Setup instructions are included with each machine.

Initialization: Initialization of the 7426 is performed after Customer Setup. A 3101 display (Canada only) or an IBM Personal Computer with 3101 emulation program and asynchronous communications adapter (Canada only) is required for initialization. During initialization, parameters such as loop carrier and data rates, parity selection and number of transmit bits are specified to customize the 7426 for a specific operational environment. See "Customer Responsibilities" below.

HIGHLIGHTS

- Terminal attachment to the 7426 is via asynchronous EIA RS-232-C/CCITT V.24/V.28 interface or EIA RS-422-A/CCITT V.11 interface. Logical appearance of 7426 to processors is that of 3276-12 control unit with up to four 3278 displays and/or 3287 printers.
- The 3276 emulation capability of the 7426 allows 3101, 3161 or 3163 displays and TTY-compatible terminals to utilize the existing 3270 programming support. (Subject to the limitations of attached devices.) Terminal connection to the 7426 can be by direct connection, or via nonswitched or switched network. The 7426 provides auto-answer support for its downstream connected terminals.
- In addition to protocol conversion, the 7426 provides a 4,800-byte storage area for storing of pre-formatted display information. The capability to store frequently used formats in the 7426 reduces the volume of data transfers between the 7426 and its host system.
- Operation of the 7426 is dependent on downstream loading of microcode from the host system to the 7426. Microcode for the 7426 is distributed by IBM to the customer's host site on a magnetic media; IBM Diskette 2D is used for an 8100 processor, and IBM Distribution Tape Reel (DTR) is used for the S/370, 43XX or 30XX processors. The microcode is installed on the host system by transferring the contents of diskette/tape into permanent disk storage. A downstream load from the host to the 7426 is initiated automatically when the 7426 is powered on.

Attachable Devices: 3101 mdls 10 and 13, 3101 mdls 20 and 23 operating in character mode, (Japan only) 3101 mdl 23K operating in character mode, (<) 3161 or 3163, 3102 printer (connected to 3101 port), 3101-837 Display RPQ 8J0002, 7485-531 RPQ display, (Canada only) IBM Personal Computer with 3101 Emulation Program (6024042) and Asynchronous Communications Adapter, (<) (Canada only) 4975-01A Printer RPQ D09033, (<) certain non-IBM TTY-compatible displays and printers. Note: An RPQ must be submitted for attachment of non-IBM, TTY-compatible terminal(s).

Device Attachment: The 7426 supports both RS-232-C/CCITT V.24/V.28 and EIA RS-422-A/CCITT V.11 interface for attaching devices. For direct connection, the distance between the 7426 and the attaching device is dependent on the device interface, up to 12m (40 ft) for EIA RS-232-C/CCITT V.24/V.28 connection, and up to 1,220m (4,000 ft) for EIA RS-422-A/CCITT V.11 connection. TP attachment via nonswitched or switched lines requires an asynchronous external modem with EIA RS-232-C/CCITT V.24/V.28 interface. The data set ready signal from the modem alerts the 7426 to an incoming call.

Communications: The 7426 mdl 1 communicates with 8100 and 4331 direct-attached loops at transmission speeds of up to 38,400 bps, and data link attached loops at up to 9600 bps. The 7426 mdl 2 uses the SDLC communications link to operate in half-duplex point-to-point or multipoint mode on half-duplex or duplex facilities at transmission speeds of up to 9600 bps. Terminal communication with the asynchronous downstream ports of the 7426 is at speeds of up to 9600 bps. See M2700 pages for communication facilities.

Customer Problem Analysis and Resolution (CPAR): Self-test diagnostics has been designed into the 7426 to enhance availability to the customer. CPAR routines and procedures are documented in the "IBM 7426 Terminal Interface Unit Customer Setup, Customer Initialization, Customer Problem Analysis and Resolution Manual", (GA23-0078). See "Customer Responsibilities" below.

Maintenance

IBM Repair Center Service: The 7426 is eligible for IBM Maintenance Agreement coverage immediately following expiration of the warranty for an annual charge.

If maintenance agreement coverage is not contracted for immediately following expiration of the warranty and the customer subsequently wants maintenance coverage, the machine(s) must be inspected by IBM.

IBM repair center service is available under the terms and conditions of the Agreement for Purchase of IBM Machines and after warranty expiration under the IBM Maintenance Agreement and the IBM Repair Center Maintenance and Machine Element Replacement Service Amendment or on a Time-and-Material Basis.

On-Site Assistance: If the customer desires assistance to perform CPAR, the local CC branch office may be called for customer engineering assistance. The CE will respond to the customer site to aid the customer in performing CPAR procedures using the same documentation available to the customer. Customer-owned spare 7426s will be installed by the CE upon request. Shipping of defective 7426s to the repair center is a customer responsibility. CE assistance is available on a per-call basis at the applicable hourly rate.

Customer Responsibilities: The Customer is responsible for:

- Adequate site, system and other vendor preparation.*
- Obtaining communication cables.
- Receipt at customer's receiving dock, unpacking and placement of unit.
- Setup of unit, connection of cables to communication lines, modems and processors, switch settings, and checkout.
- Initialization of the 7426.

- Price quotations, installation and cost of common carrier equipment and service.
- Determination of the required number of spares.
- Performing Customer Problem Analysis and Resolution.
- Returning failing 7426 to repair center with a completed Repair Authorizations form.

* Each customer should order the "IBM 7426 Terminal Interface Unit Description, Site Planning and Programming Guide", (GA23-0077), for installation and planning work.

Spares: It is recommended that the customer order a sufficient number of spares to meet the operational requirements of his site. The recommended number of spares is:

Number of 7426s Installed	Recommended 7426 Spares
1-15	1
30	1
50	1
75	2
100	2
200	3
300	3
500	5
700	6
1000	7

The customer should be advised to test spares for correct operation before putting them on the shelf.

Warranty Service and Maintenance: The normal procedure will be for the customer to isolate the failure to a 7426 and ship it to the designated IBM Repair Center. All maintenance, parts replacement, adjustments, and repair shall normally be performed at the designated IBM Repair Center.

When maintenance is required, it shall be the customer's responsibility to determine the failing 7426, pack the 7426 in the designated shipping container and ship it prepaid to the designated IBM Repair Center. IBM will ship the repaired machine prepaid. There is no regularly scheduled preventive maintenance recommended by IBM on these machines.

Repair center service is available under the IBM Maintenance Agreement and the IBM Repair Center Maintenance and Machine Element Replacement Service Amendment (Z120-2240-5), or on a Time-and-Material basis.

Customers with machines not under an IBM Maintenance Agreement must have the option to ship the machines to the designated IBM Repair Center for repair. The IBM Machine Repair Authorization Form is to be completed with all shipments to the repair center. Alternatively, upon request, IBM will provide, for a minimum charge, an estimate of repair charges. This charge covers handling, inspection, cleaning, adjustments, testing, estimating of repair charges, and return shipping charges.

Publications: "IBM 7416 Terminal Interface Unit Description, Site Planning, and Programming Guide", (GA23-0077) -- "IBM 7426 Terminal Interface Unit Customer Setup, Customer Initialization, Customer Problem Analysis and Resolution", (GA23-0078). (Shipped with each unit.)

SPECIFY

Unless indicated otherwise, the following specify features are only available at time of manufacture.

- Voltage (120V AC, 1-phase, 3-wire, 60 Hz): Power cable 1.8m (6 ft), nonlocking plug.

7426 Terminal Interface Unit

- (Japan only) > 100V AC, 1-phase, 3-wire, 50/60 Hz: Power cable 4.3m (14 ft), locking plug. <
- Nomenclature:

Canadian	#2935	Spanish
French	#2935	Speaking
English US	#2924	
- Magnetic Media: One copy of magnetic media (i.e., downstream load microcode) is needed for each 8100, S/370, 43XX, or 30XX system to which the 7426 attaches; i.e., on a single system attaching multiple 7426s, only one 7426 must specify the magnetic media. An MES order will be processed for a 7426 that did not specify magnetic media on the original order.

Order magnetic media by part number:

Part	Magnetic	Number	Media	System
2720177	Diskette 2D	8100	2720253	9/600
	Magnetic Tape	S/370, 43XX		
		or 30XX	2720254	9/1600
	Magnetic Tape	S/370, 43XX		
		or 30XX	2720255	9/6250
	Magnetic Tape	S/370, 43XX		
		or 30XX		

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Cables: Device attachment cables are not provided with the 7426 and must be ordered separately. Order by part number and specify the desired cable length. Procurement of cables for non-IBM TTY compatible devices is a user responsibility.

P/N	Description
2720173	Direct connect 3101, 3161 or 3163, EIA RS-232-C. Maximum Length: 12m (40 ft.)
2720150	Direct connect 3101, 3161 or 3163, EIA RS-422-A. Maximum Length: 1,220m (4,000 ft.)
(Canada only> 2720399	Direct connect 4975, EIA RS-232-C. Maximum Length: 12m (40 ft.)<
2720174	Modem Connection EIA RS-232-C. Maximum Length: 12m (40 ft.)
(Canada only> 6235645	Direct Connect IBM Personal Computer, EIA RS-232-C. Maximum Length: 12m (40 ft.)<

(Japan only>
2722252 Stub Cable: Must be ordered
with P/N 2720174<)

SUPPLIES (NONE)

Do not reproduce without written permission

7531 INDUSTRIAL COMPUTER

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

PURPOSE

The 7531 is designed for information-handling applications in industrial plant floor environments, where a system more resistant to harsh physical conditions is required. The 7531 is designed for floor-standing operation. It is based on a high performance Intel 80286 microprocessor, and is equipped with a high capacity (1.2Mb) diskette drive, 512Kb of standard memory, keyboard, clock/calendar with battery backup, ROM-based BASIC language, and other advanced features.

MODELS

Model 041: System Unit/Keyboard, 512Kb Memory, high capacity 1.2Mb Diskette Drive, ROM Based BASIC Language, clock/calendar with battery backup, diskette area cover door with security keylock.

Prerequisites: The 7531 requires a video display adapter and device for display output. It is powered by a standard 115/230 volt, 50 Hz or 60 Hz power source (voltage can be switched by user). IBM Personal Computer DOS 3.0 or later is required (DOS 3.1 is required for the IBM PC Network).

Packaging: The system unit, keyboard, and options are packed in separate cartons. An additional carton contains the power cord, the 7531 Industrial Computer Installation and Setup manual, and the 7531 Industrial Computer Operator's Guide.

Limitations: Other 5531 Industrial Computer options, adapters, or devices not specifically listed or supported by the 7531 are not supported. Some of these non-supported items include:

- 64Kb Memory Module Kit (#1003)
- 64/256Kb Memory Expansion Option (#1013)
- 5531 Keyboard
- Asynchronous Communications Adapter (#2074)
- Binary Synchronous Communications Adapter (#2075)
- SDLC Communications Adapter (#2090)
- 10Mb Fixed Disk Drive (#2500)
- Fixed Disk Adapter (#2501)
- 5-1/4" Diskette Drive Adapter (#3780)
- 5-1/4" Dual-sided Diskette Drive (#3810)
- XT/370 Option Kit (#1509)
- Combination Adapter (#6000)
- Keylock Option Kit (#6002)

Customer Setup (CSU): The 7531 and its options are customer setup. CSU allowance is one day. Detailed setup instructions are included with each machine and option. Setup service is available from the IBM National Service Division at IBM hourly rates and minimums, or by a Contract Support Service (CSS) Agreement.

HIGHLIGHTS

Standard Features:

- Advanced high-performance Intel 80286 microprocessor
- ROM-based automatic power-on self-test of system components
- ROM-based BASIC language interpreter
- 8086 compatible real address mode
- Protected virtual address mode
- 512Kb of memory

- 1.2Mb high-capacity diskette drive
- Combination fixed disk and diskette adapter
- Fixed disk-in-use indicator light (yellow)
- System clock/calendar/system configuration storage with battery backup
- Sound system
- System reset button
- Diskette area cover door with security keylock
- Bi-directional keyboard interface
- Keyboard
- Switchable worldwide power supply with cooling fan
- Cooling fan with removable filter
- Power-on indicator light (green)
- Eight input/output (I/O) expansion slots with retainer bar to secure feature cards
- Socket for Intel 80287 Math Co-processor
- 24-bit addressing
- 16-bit data path
- Seven-channel direct memory access (DMA)
- 16-level interrupt
- Three programmable timers

Compatibility: The following hardware products are supported on the 7531:

- IBM 5532 Industrial Color Display
- IBM 7534 Industrial Graphics Display
- IBM 5178 PC Network Translator Unit

Note: The IBM 5178 PC Network Translator Unit environmental specifications are lower than those of the 7531. Consequently, the translator unit must be installed in a location where the environmental conditions are similar to those of an office environment.

DESCRIPTION

The 7531 Industrial Computer has been designed to meet industrial environmental conditions. These conditions can be summarized as follows:

- extended temperature operation
- extended vibration and shock operation
- extended voltage transients operation
- extended particulates operation

The 7531 provides plant floor personnel with a system capable of handling computer applications in the plant floor environment.

The 7531 is designed for floor-standing operation. The system unit base is provided with four holes to facilitate optional bolting to the floor or other stable platform. Bolting should be considered only in those situations where placement of the 7531 may affect the stability of the system unit. However, the 7531 is not required to be bolted for proper operation of the system.

The 7531 is based on a high performance 16/24-bit Intel 80286 microprocessor, and is equipped with a high capacity (1.2Mb) diskette drive, keyboard, ROM based BASIC language, clock/calendar with battery backup, diskette area cover door with security keylock, and system reset button. Standard memory is 512Kb. The system may be further expanded to 640Kb with the

128Kb memory expansion or 128Kb memory board options or up to 3Mb with 512Kb memory options.

The system can be further expanded through additional customer setup options. One or two 20Mb Fixed Disk Drives, a second 1.2Mb High Capacity Diskette Drive, and a Dual-sided (320/360Kb) Diskette Drive are available. A maximum of two diskette drives and one fixed disk drive, or one diskette drive and two fixed disk drives can be installed in the system unit. These combinations result in direct access storage capacity of up to 41.2Mb.

DOS 3.0 supports the 20Mb Fixed Disk Drive and 1.2Mb High Capacity Diskette Drive in the 7531 system. With DOS 3.0, the 1.2Mb diskette drive will also read single- and dual-sided diskettes formatted at 160/180Kb and 320/360Kb capacity, respectively. The Dual-sided Diskette Drive (320/360Kb) option is available for downward diskette portability with the 5531 Industrial Computer and IBM Personal Computers.

To fully utilize the 1.2Mb High Capacity Diskette Drive, new diskette media is required. The media is available from the IBM Systems Supplies catalog with the following description:

IBM 5.25 Diskette 2HC, double-sided, high capacity, 96 tracks per inch, soft sectored, P/N 6109660.

To order diskettes, contact IBM Direct, toll-free via 1-800-IBM-2468.

Eight option (feature) slots support feature cards for devices, features, or memory. Six of the slots support either the advanced 16-bit or 8-bit option cards. Two support 8-bit option cards only. However, the 7531 uses one 16-bit slot for the standard combination fixed disk and diskette drive adapter. The result is seven available expansion slots. A retainer bar is provided to secure the feature cards in-place.

Included are a cooling fan for the world-wide power supply, and a cooling fan with removable filter for the system unit features. The 7531 also includes a diskette area cover door with security keylock, which, when locked by the user, prevents initialization of the system, and entry of command/data from the keyboard.

The keyboard offers commonly used data and word processing functions along with separate typewriter and numeric keypads. Key-locations enhancements and mode indicators (Cap Lock, Numeric Lock, Scroll Lock) improve keyboard usability. Special symbols may be accessed with a combination of keys. Depending on the application program, from 10 to 40 special function keys may be supported.

The keyboard is attached to the 7531 via a ten-foot coiled cable, permitting a variety of workspace configurations.

TECHNICAL INFORMATION

System Unit:

- INTEL 80286 microprocessor
- 6.0 MHz clock speed
- 24-bit addressing
- 16-bit data path
- 64Kb ROM
- Access time - 150ns
- Cycle time - 355ns
- Dimensions:
 - Depth: 600.0mm (23.6 in)
 - Width: 266.0mm (10.5 in)
 - Height: 650.0mm (25.6 in)

Weight: 36.3 Kg (80 lbs.)

SPECIFIED OPERATING ENVIRONMENT

- Electrical:
 - 192 watt power supply
 - AC Operating Voltages:
 - 90-137V, 50-60 Hz
 - 180-259V, 50-60 Hz
 - Power line lightning surges of +/- 2500 volts, as outlined in FCC Docket 19528 - Part 68
- Air Temperature:
 - System on: 0 degrees to 50 degrees C (32 degrees to 120 degrees F)
 - System off: 0 degrees to 55 degrees C (32 degrees to 131 degrees F)
- Relative Humidity: 8 per cent to 80 per cent non-condensing
- FCC Class A
- Particulates Contaminants Filtering:
 - Suspended particulates: 500 micrograms per cubic meter
 - Benzene soluble organics: 30 micrograms per cubic meter
 - Settleable particulates: 1500 micrograms per square centimeter for 30 days
- Shock: 0.5G at 10 millisecond duration
- Vibration:
 - 5 to 17 Hz at 0.005 inches double amplitude displacement
 - 17 to 200 Hz at 0.07G peak
 - 200 to 500 Hz at 0.036G peak
- BTU Output: 1229 BTU/Hr

Publications: The system will be shipped with two manuals:

- IBM 7531 Industrial Operator's Guide (#6046)
- IBM 7531 Industrial Computer Installation and Setup Manual (#6047)

The following manuals are available for purchase:

- IBM 7531/7532 Industrial Computer Technical Reference Manual System Unit (#6032)
- IBM 7531/7532 Industrial Computer Maintenance Information Manual (#6033)
- IBM Industrial Computer Technical Reference Options and Adapters (#6035)
- IBM Personal Computer BASIC Reference Manual Version 3.0 (#1132)

Technical Assistance: Customers who have signed an IBM Industrial Computer Volume Procurement Amendment (VPA) and have ordered twenty or more 7531 Industrial Computers may designate from one to three technical coordinators who may contact the Personal Computing Assistance Center (PCAC) for usage assistance. The usage assistance is available for the contract period.

Customer technical coordinators may participate in an education program administered by the PCAC. The education may be self-study or conducted in a classroom at a PCAC-selected location.

SPECIFY (NONE)

SPECIAL FEATURES

512Kb Memory Expansion Option (#0203): Adds memory above 1Mb, in 512Kb increments. Up to five options may be plugged into the I/O expansion slots of the system unit to provide a total of three megabytes of primary storage. Performance characteristics are the same as other 7531 user memory. Note: This option may not be used for address storage from 512Kb to 640Kb. The memory range from 640Kb to 1Mb is reserved for system functions. Each memory increment requires one 16-bit expansion slot.

128Kb Memory Expansion Option (#0209): Expands the memory from 512Kb to 640Kb. Performance characteristics are the same as other 7531 user memory. Only one #0209 may be installed. It requires a 16-bit expansion slot. Limitation: Cannot be installed with the 128Kb Memory Board for the Combination Adapter II (#6040).

Math Co-Processor (#0211): A high performance numeric 80287 processor extension with floating point, extended integer, and BCD data types, compatible with the Intel 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Only one #0211 can be installed in a system unit.

PC Network Adapter (#0213): The IBM PC Network is a low cost, broadband, local area network. It provides a reliable, low maintenance network using standard 75 ohm coaxial cable (CATV compatible) and standard broadband components. The network uses carrier sense multiple access/collision detect (CSMA/CD) protocol to transmit data at 2 million bits per second. The network consists of the IBM 5178 PC Network Translator Unit which provides single channel frequency translation for the network, the IBM PC Network Adapter (#0213) which attach IBM Industrial and Personal Computers to the network, and eight IBM PC Network Cabling Components which may be used to attach up to 72 IBM Industrial and Personal Computers within a 1,000-foot radius of the translator unit.

The IBM 5178 PC Network Translator Unit provides fixed frequency translation for the IBM PC Network. One translator unit is required for each network. The translator unit is supplied with a separately packaged 120-volt transformer which plugs into a standard grounded electrical outlet.

The IBM 5178 PC Network Translator Unit environmental specifications are lower than those of the 7531. Consequently, the translator unit must be installed in a location where the environmental conditions are similar to those of an office environment.

The translator unit has a connector assembly for attaching up to eight IBM Industrial or Personal Computers within a radius of 200 feet (cable segments may be purchased separately). The translator also has an expansion port for attaching the IBM PC Network Base Expander (#0230), which permits attachment of up to 64 additional Industrial or Personal Computers to the network, for a total of 72.

The IBM PC Network Adapter is a feature card that plugs into each IBM Industrial or Personal Computer in the network. It is supplied with a 3m (9 ft) attachment cable which can be connected directly to, or within 200 feet of the IBM PC Network Translator Unit. The IBM PC Network Cabling Segments are used to extend the distance up to 200 feet.

The optional IBM PC Network Cabling Components contain a variety of preassembled wires and connectors that permit installation of a variety of network topologies. They are designed to extend the functional capabilities of the network. These cabling components can be used to increase the maximum number of attached stations from 8 to 72, and to increase the maximum distance of coverage from a radius of 200 feet to a radius of 1,000 feet. The cable component options which provide for end-to-end connection, include a Base Expander, three Expansion Kits, and four Cable Segments preassembled from standard CATV components. Standard F connectors are used to connect cable components.

The IBM PC Network Base Expander (#0230) is required to grow the network to more than eight IBM Industrial or Personal Computers

or more than a 200-foot radius from the translator unit. The base expander is a prerequisite for the attachment of up to eight Short, Medium, or Long Distance Kits in any combination. Each distance kit can attach up to eight IBM Industrial or Personal Computers. In addition, the medium and long distance kits extend the network by 400 feet and 800 feet, respectively. In combination with cabling segments, the short, medium, and long distance kits can extend the network up to a 1,000-foot radius from the translator unit.

● PC Network Cabling Components

- Base Expander (#0230)
- Distance Kit
 - Short (#0231)
 - Medium (#0232)
 - Long (#0233)
- Cabling Segments
 - 25-foot (#0234)
 - 50-foot (#0235)
 - 100-foot (#0236)
 - 200-foot (#0237)

Serial/Parallel Adapter (#0215): Provides a serial port and a parallel port. The serial portion is fully programmable and supports asynchronous communications from 50 to 9600 baud. The back of the adapter has a nine-pin D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. A maximum of two Serial/Parallel Adapters may be installed. Only one Serial/Parallel Adapter may be installed if a Combination Adapter II (#6020) is installed. Each requires one expansion slot of either type. Note: This adapter does not support current loop operation.

Prototype Adapter (#0220): This adapter is 4.8 inches high by 13.12 inches long. Two card edge tabs, one 2 by 31 positions and one 2 by 18 positions, provide all system control signals and voltages. No components are shipped with this card.

The adapter contains a voltage bus (+5 Vdc) and a ground bus (0 Vdc). Each bus borders the adapter with the ground bus on the component side and the voltage bus on the pin side. A system interface (wiring only) is also provided with a space for a jumper to specify whether the device has an 8- or a 16-bit data bus. This adapter also accommodates a D-shell connector from 9 to 37 positions. A recommended system interface logic diagram is available along with a list of recommended components to be used to interface custom logic to the 7531. Up to five Prototype Adapters can be installed in a system unit. Each requires a 16-bit expansion slot.

Enhanced Graphics Adapter (#1200): Provides support for the new 7534 Industrial Graphics Display and enhanced support for the 5532 Industrial Color Display. It requires one expansion slot of either type. The IBM Graphics Memory Expansion Card (#1201) expands the IBM Enhanced Graphics Adapter's 64Kb memory to 128Kb and increases the color range for 640 x 350 graphics from four colors to 16 colors. The IBM Graphics Memory Module Kit (#1203) expands the expansion's card memory to 256Kb providing additional graphics function.

The Enhanced Graphics Adapter:

- Supports the 5532 Industrial Color Display or the new 7534 Industrial Graphics Display.
- Allows full 16-color graphics with the 5532 Industrial Color Display in either 320 x 200 medium definition graphics or 640 x 200 high definition graphics modes
- Provides 640 x 350 support in up to 16 colors for graphics on the new 7534 Industrial Graphics Display.

MACHINES

- Provides high quality (8 x 14 character box) text in color on the new 7534 Industrial Graphics Display.
- Allows users to select under program control from a palette of 64 colors when connected to the new 7534 Industrial Graphics Display.
- Provides 64Kb graphics memory on the IBM Enhanced Graphics Adapter expandable to 128Kb with the Graphics Memory Expansion Card.
- Expands graphics memory to 256Kb with the Graphics Memory Module Kit. This added memory may be used to support smooth scrolling, panning (scanning sequentially through graphics memory), and additional pages of graphics data.
- Allows compatibility modes to execute programs written for the IBM Color/Graphics Monitor Adapter with the 5532 Industrial Color Display. Composite video support for attaching analog monitors or TV sets is not provided.
- Allows RAM-resident character generator to be loaded from user programs allowing any set of 256 characters to be incorporated into applications.
- Allows character space expansion to 512 with the IBM Graphics Memory Expansion Card and to 1024 with the IBM Graphics Memory Module Kit.
- Allows character box sizes up to 32 dots high and 8 dots wide.

Binary Synchronous Communications Adapter (#1204): Provides an EIA RS-232-C interface. It is compatible with the 7532 Industrial Computer, the 5531 Industrial Computer, the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM Personal Computer AT. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter (#1205) is installed. Each adapter requires one expansion slot of either type.

SDLC Communications Adapter (#1205): Provides an EIA RS-232-C interface. It is compatible with the 7532 Industrial Computer, the 5531 Industrial Computer, the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer and the IBM Personal Computer AT. Only one SDLC Adapter may be installed. It requires one expansion slot of either type.

PC Cluster Adapter (#1206): To connect the 7531, in a clustered multi-user configuration, consisting of other 7531s, 7532 Industrial Computers, 5531 Industrial Computers and IBM Personal Computers. This option supports up to 64 computers in a cluster (actual number is dependent on performance characteristics). Each computer in the cluster beyond the first two requires an additional PC Cluster Cable Kit (#1207). The adapter requires one expansion slot of either type.

Data Acquisition and Control Adapter (#1502): An analog and digital I/O card that can be plugged directly into the system unit. This option can be used in a scientific/industrial laboratory setting to control processes, monitor transducers (flow, pressure, temperature, etc.), and automate electronic testing. It requires one expansion slot of either type.

The IBM Data Acquisition and Control Adapter Distribution Panel (#1504) is an optional feature that provides easy access to the I/O signals, voltages, and grounds of the IBM Data Acquisition and Control Adapter. The distribution panel is connected to the adapter by a shielded cable. The distribution panel is a printed circuit board with four barrier-type screw terminal strips for a total of 88 terminations. A shielded flat cable with a 60-pin connector is permanently attached to the board. The cable and terminal board assembly is housed in a metal enclosure that is slotted to allow user cabling to enter or exit. The cable is approximately 34 inches long.

Up to four IBM Data Acquisition and Control Adapters can be attached to the 7531.

The Adapter has:

- Four analog input channels (12-bit resolution)

- Two analog output channels (12-bit resolution)
- 16-channel digital input port
- 16-channel digital output port
- Programmable sampling rates provided by a 32-bit timer
- Event counter, programmable rate generator, or programmable time delay provided by a 16-bit user timer/counter

The Distribution Panel has:

- Screw terminals provided to attach devices to the distribution panel
- Multiple grounds for twisted pair terminations
- Shielded construction to minimize noise interference.

Application areas that may be addressed with the IBM Data Acquisition and Control Adapter include:

- Chromatography
- Electrochemistry
- Energy management
- Electronic testing
- Process control
- Data logging
- Robotics

Some parameters commonly monitored or controlled include:

- Pressure
- Flow
- Temperature
- Displacement
- Voltage
- Light intensity
- Rotational speed

Some examples of instruments or devices that may utilize the Adapter are:

- Chromatographs
- Spectrophotometers
- Pressure gauges
- Relay controls
- Thermocouples
- Gas analyzers
- Humidity sensors
- Valve actuators
- Level gauges
- Load cells
- Conductivity cells
- pH meters

General Purpose Interface Bus Adapter (#1503): Provides an interface between the 7531 and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of multiple devices or instruments (such as plotters, multimeters, and disk drives). Up to four GPIB Adapters can be installed in a system unit. Each adapter requires one expansion slot of either type. The IBM GPIB Adapter can perform as a controller, a talker, or a listener with compatible devices. The IBM GPIB Adapter also provides capabilities for data transfer between work stations, and the connection of several computers for sharing of instruments or peripheral I/O devices.

The IBM GPIB Adapter is designed to the ANSI/IEEE-488 standard, including the 488A-1980 supplement, and:

- Supports up to 14 devices or instruments
- Provides a direct memory access data rate of up to 300Kb/second
- Provides a programmed I/O data rate of up to 20Kb/second
- Allows user selection of direct memory access channels
- Allows user to select interrupt level

Communications Adapter Cable (#2067): This cable allows the user to connect the Binary Synchronous Communications Adapter (#1204) or the SDLC Communications Adapter (#1205) to a modem via a plug at the rear of the 7531. The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Industrial Computer with a network adapter to the IBM Cabling System.

Color/Graphics Monitor Adapter (#4910): To attach a color display to the 7531, either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5532 Industrial Color Display, 7534 Industrial Graphics Display, a video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16 foreground and 8 background colors are supported in text (character) mode. This attachment also provides support for 4-color medium definition graphics (320 dots horizontal, 200 dots vertical) and black and white high-definition graphics (640 dots horizontal, 200 dots vertical). 256 characters are available in "text" mode, 128 in medium or high definition graphics. The adapter provides 16Kb of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. It requires one expansion slot of either type.

IBM Token-Ring Network PC Adapter II (#5063): Allows the IBM Industrial Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette and supporting documentation. The diskette includes adapter and ring diagnostics and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS) and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media.

20Mb Fixed Disk Drive (#6019)(#6045): Two optional fixed disk drives may be installed on the 7531, providing a total of 40Mb of fixed disk storage capacity. Space and power are provided in the system unit for the drive(s). All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit.

Characteristics:

- 20Mb of storage
- 512 bytes per sector
- 17 sectors per track
- 75 ms average access time
- 3600 RPM
- 5M bit per second transfer rate
- Dimensions:
 - Height - 82.55mm (3.25 in.)
 - Width - 146.05mm (5.75 in.)
 - Depth - 203.20mm (8.00 in.)
 - Weight - 2.3 Kg (5.1 lbs.)

Combination Adapter II (#6020): Provides the 7531 with four main functions: an asynchronous communications interface, a parallel printer interface, a programmable timer, and a thermal sensor interface. The adapter requires one 16-bit expansion slot.

The asynchronous communications interface is fully programmable and supports asynchronous communications only. All of the specifications of this interface match those of the Serial/Parallel Adapter (#0215). In addition, the serial interface can be configured to support an RS-422 interface. The cable interface to the asynchronous communications port is via a 9-pin connector at the rear of the system unit. The Combination Adapter Cable (#6001) is required to convert the 9-pin Asynchronous Communications port of the Combination Adapter II to a 25-pin "D" shell, male type connector for attachment to an external modem or other asynchronous devices.

The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable.

The parallel printer interface is specifically designed to attach printers with a parallel interface. All of the specifications of this interface match those of the Serial/Parallel Adapter (#0215).

The programmable timer has a counter resolution of 4/1,000 of a second.

The thermal sensor interface connects to a thermal sensor inside the system unit and allows the system processor to sense when the system unit is over its specified temperature range. A bit in the sensor port is set by the thermal sensor to indicate to the system software (DOS) that the system unit is over its specified temperature range.

High Capacity Diskette Drive (#6038): This is a half-high, 5-1/4 inch, dual-sided drive with 1.2Mb storage capacity. Space and power have been provided in the system unit for up to two drives. The drive is fully self-contained and consists of a spindle drive system, a read positioning system and a read/write/erase system.

One of these drives is standard in the 7531. An optional second drive may be installed in the system unit adjacent to the first if the space is not occupied by another diskette drive. Both drives use the standard combination fixed disk and diskette drive adapter in the system unit. The number of fixed disk drives and diskette drives must not exceed three.

The drive uses the new 96-TPI, high density media. In addition, it will read or write 48-TPI, single- or dual-sided media written for the 5531 Industrial Computer and IBM Personal Computers, giving a high level of compatibility with existing applications. However, once the 48-TPI media has been written in this drive, it may only be read by a high capacity diskette drive.

Characteristics:

- 1.2Mb storage
- 512 bytes per sector
- 15 sectors per track
- 96 tracks per inch
- Two sides
- 80 tracks per side
- 360 RPM
- Supports 300 and 500K bits/second data transfer rate
- 94 ms average access time in 96-TPI mode
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 149.0mm (5.9 in.)
 - Depth - 202.1mm (8.0 in.)
 - Weight - 1.6 Kg (3.5 lbs.)

Dual-sided Diskette Drive (#6039): This diskette drive permits the exchange of 320/360Kb diskette media between the 7531, the 5531 Industrial Computer, and IBM Personal Computers. It is a half-high, 5-1/4 inch, dual-sided drive with a 320/360Kb storage capacity. Space and power for one drive have been provided in the system unit. The drive is fully self-contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system.

This drive is installed in the system unit adjacent to the standard high capacity diskette drive if the space is not occupied by another diskette drive. This drive uses the standard combination fixed disk and diskette drive adapter in the system unit. The number of fixed disk drives and diskette drives must not exceed three.

Characteristics:

- 320/360Kb of storage
- 512 bytes per sector
- 8/9 sectors per track
- Two sides
- 91 ms average access time
- 40 tracks per surface
- 48 tracks per inch
- 300 RPM
- Transfer rate of 250K bits/second
- Dimensions:
 - Height - 42.9mm (1.7 in.)

Width - 149.0mm (5.9 in.)
Depth - 202.1mm (8.0 in.)
Weight - 1.6 Kg (3.5 lbs.)

128Kb Memory Board for the Combination Adapter II (#6040): Plugs into the Combination Adapter II (#6020) and expands the memory from 512Kb to 640Kb without requiring an expansion slot. Performance characteristics are the same as other 7531 user memory. Only one 128Kb Memory Board may be installed on a Combination Adapter II. Limitation: Cannot be installed with 128Kb Memory Expansion (#0209).

IBM Realtime Interface Co-Processor (#6050, #6160, #6165, #6166): The IBM Realtime Interface Co-Processor is an interface subsystem for IBM Industrial Computers and IBM Personal Computers. A Realtime Interface Co-Processor (ARTIC) in conjunction with its software support provides support for attachment of Programmable Controllers in industrial applications.

The IBM Realtime Interface Co-Processor will be available with either 128KB or 512KB of standard memory and either 5.25 or 3.5-inch program media.

● Standard Features

- Advanced high-performance Intel(1) 80186 microprocessor
- 128KB or 512KB of dual-ported memory with parity for error detection (128KB expandable to 256KB, 512KB expandable to 1024KB)
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the co-processor storage and its interface ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Two serial I/O ports
- Data rates up to 64K bps full duplex with external clocking on one port, while the second port is operated at 19.2K bps full duplex.
- Transmit and Receive status-indicators
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support
- CRC generation and checking
- Pluggable Interface Boards
- Custom Interface Board support
- Byte-wide I/O Interface available at Interface Board Connector
- All external signals available at Interface Board connector
- Five programmable hardware timers
- Watchdog timer
- Watchdog timer status-indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - ▲ Hardware setup
 - ▲ Software setup
 - ▲ Problem determination procedures
 - ▲ Customer diagnostics diskette.
- Realtime Control Program microcode
 - ▲ Multi-tasking, preemptive priority
 - ▲ Co-Processor memory management
 - ▲ Timer support
 - ▲ Watchdog timer support
 - ▲ Queue management
 - ▲ Inter-task communications
 - ▲ Initial Program Load.
- ROM-based automatic power-on self-test of Co-processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

● Optional Features

- EIA RS-232-C/CCITT V.24 Interface Board (#6051)
- EIA RS-422-A Interface Board (#6064)
- CCITT V.35 Interface Board (#6053)
- 20ma Current Loop Interface Board (#6066)

- Realtime Interface Co-Processor 128KB Memory Expansion (#6055) (can only be used with features #6050 and #6165)
- Realtime Interface Co-Processor 512KB Memory Expansion (#6161) (can only be used with features #6160 and #6166)
- RS-232-C Direct Attach Interface Cable (#6056)
- RS-232-C Modem Attach Interface Cable (#6057)
- IBM Realtime Interface Co-Processor Technical Reference (#6058)
 - ▲ Hardware technical information
 - ▲ Realtime Control Program microcode description
 - ▲ Interface Board design information.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (#6059)
 - ▲ Problem determination procedures
 - ▲ Advanced Diagnostics Diskette
 - ▲ Wrap connector
- CCITT V.35 Interface Cable (#6061)

The Realtime Interface Co-Processor has been designed for use in industrial applications of the IBM Industrial Computers and IBM Personal Computers. The Co-Processor is compatible with the 5531, 7531, 7532, 5160, and 5170 computer systems. The 5531 Industrial Computer and 5160 Personal Computer are based on the Intel(1) 8088 microprocessor. The 7531 and 7532 Industrial Computers and 5170 Personal Computer are based on the Intel(1) 80286 microprocessor.

The Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are two independent serial ports that operate at speeds up to 64K bps using direct memory access. One port can operate at 64K bps full duplex, while the second is operated at a maximum of 19.2K bps full duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the Co-Processor is designed to accept two optional interface boards or user developed custom interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the Interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20ma Current Loop Interface Board
- CCITT V.35 Interface Board.

A maximum of two Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be found in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit mode on the 5531 and 5160 and in 8-bit or 16-bit mode on the 7531, 7532 and 5170.

The Realtime Interface Co-Processor will be available in two memory capacities, 128KB and 512KB, and will be shipped with either 5.25-inch or 3.5-inch program media.

- IBM Realtime Interface Co-Processor with 128KB of memory and 5.25-inch program media (#6050)
- IBM Realtime Interface Co-Processor with 128KB of memory and 3.5-inch program media (#6165)
- IBM Realtime Interface Co-Processor with 512KB of memory and 5.25-inch program media (#6160)

- IBM Realtime Interface Co-Processor with 512KB of memory and 3.5-inch program media (#6166)

All Realtime Interface Co-Processor features are functionally equivalent. Features #6050 and #6165 are shipped with 128KB of memory, upgradeable to 256KB, and features #6160 and #6166 are shipped with 512KB of memory, upgradeable to 1024KB. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128KB Memory Expansion Option (#6055) (Can only be used with features #6050 and #6165)
- 512KB Memory Expansion Option (#6161) (can only be used with features #6160 and #6166)

Detailed technical information on the Realtime Interface Co-Processor is provided in the optional Realtime Interface Co-Processor Technical Reference (#6058).

Realtime Control Program: The Realtime Control Program is microcode for the Realtime Interface Co-Processor. It is included with the Co-processor feature and is shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The Realtime Control Program microcode provides a realtime, multi-tasking operational environment for supporting user applications running on the Realtime Interface Co-Processor. The Realtime Control Program microcode is loaded from the system unit memory to the Realtime Interface Co-Processor memory. Once loaded, the Realtime Control Program microcode initializes itself and the Realtime Interface Co-Processor. It then signals the system unit processor that it is loaded and ready.

The Realtime Control Program microcode supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the Realtime Control Program microcode may communicate with another task running under the control program or with an application program running in the system unit.

The Realtime Control Program microcode provides support for interfacing IBM Industrial Computer or Personal Computer applications to the Realtime Control Program microcode and uses the IBM PC Macro Assembler as the program-preparation facility.

The Realtime Control Program microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 256 software timers with increments ranging from 5 ms to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Intertask communications is accomplished by the wait/post mechanism. Data may be passed between tasks by user queues.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Realtime Interface Co-Processor upon failure. It will also switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the Realtime Control Program microcode is provided in the optional Realtime Interface Co-Processor Technical Reference (#6058).

The Realtime Interface Co-Processor can coexist with the following IBM Industrial and Personal Computer adapters:

- 64/256KB Memory Expansion Option (#1013)
- 128KB Memory Expansion (#0209)
- 512KB Memory Expansion (#0203)
- PC Network Adapter (#0213)
- Enhanced Color Graphics Adapter (#1200)
- Combination Adapter II (#6020)
- Binary Synchronous Communications Adapter (#1204)
- SDLC Communications Adapter (#1205)
- Asynchronous Communications Adapter (#2074)
- Personal Computer Cluster Adapter (#1206)
- Data Acquisition and Control Adapter (#1502)

- General Purpose Interface Bus Adapter (#1503)
- Color/Graphics Monitor Adapter (#4910)
- Serial/Parallel Adapter (#0215)
- 10MB Fixed Disk Drive/Adapter Kit (#6018)
- Printer Adapter (#5200)
- Monochrome Display and Printer Adapter (#4900)
- 3278/79 Emulation Adapter (#2507)
- XT/370 Option Kit (#3891)
- Token-Ring Network PC Adapter (#9100)
- Voice Communications Adapter (#4839)
- Game Control Adapter (#1300)
- Enhanced Display Station Emulation Adapter (#2879)
- 5253 Emulation Installation Convenience kit (#2882)
- 5250 Emulation Convenience Kit (#2886)
- AT/370 Option Kit (#6115)
- XT/370 Option Kit (#1509)

Publications: The Realtime Interface Co-Processor will be shipped with one manual:

- "IBM Realtime Interface Co-Processor Guide to Operations"

The Guide to Operations covers the Realtime Interface Co-Processor and the optional Interface Boards and cables. The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Realtime Interface Co-Processor, optional Interface Boards, and cables. This publication is intended for anyone who will be installing, using, or programming the Realtime Interface Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- "IBM Realtime Interface Co-Processor Technical Reference" (#6058)

The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Also included is detailed technical information on Interface Board design. It describes the interface between the Realtime Interface Co-Processor and the pluggable Interface Board. Detailed information on the programmer interfaces to the Realtime Control Program microcode is included.

The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Realtime Interface Co-Processor, Realtime Control Program microcode, optional Interface Boards and cables.

- "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (#6059)

The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Realtime Interface Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and a 15-pin wrap-connector for use when running Co-Processor diagnostics.

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed in the "Compatibility" section of this document are not supported.

The Realtime Interface Co-Processor is not designed to run DOS applications but is intended for industrial applications written to interface with the Realtime Control Program microcode.

In most system configurations, one Realtime Interface Co-Processor can be installed in the 5531 and 5160 computers, and up to three can

be installed in the 7531, 7532, and 5170 Computers. For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 80286-based IBM Industrial and Personal computers prohibits an 8-bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a 16-bit adapter (Realtime Interface Co-Processor) within the same region.

See the "IBM Realtime Interface Co-Processor Technical Reference" for complete details.

Prerequisites: The Realtime Interface Co-Processor must be installed in one of the following systems:

- 5531 Industrial Computer
- 7531 Industrial Computer
- 7532 Industrial Computer
- 5160 Personal Computer
- 5170 Personal Computer

Customer Setup (CSU): The Realtime Interface Co-Processor and all options are customer setup (CSU). CSU allowance is one (1) day. Detailed setup instructions are included with each co-processor card. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

Special Features:

EIA RS-232-C/CCITT V.24 Interface Board (#6051): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.

EIA RS-422-A Interface Board (#6064): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4000 ft, however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

CCITT V.35 Interface Board (#6053): Adapts one of the Co-Processor's serial ports for compatibility with CCITT V.35 interfaces.

20ma Current Loop Interface Board (#6066): Adapts one of the Co-Processor's serial ports for compatibility with 20ma interfaces. The current loop interface board also has the capability to provide the 20ma current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment. See the IBM Realtime Interface Co-Processor Technical Reference for details.

Realtime Interface Co-Processor 128KB Memory Expansion (#6055): Expands the Realtime Interface Co-Processor (#6050 and #6165) memory from 128KB to 256KB. Only one 128KB Memory Expansion Option may be installed.

Realtime Interface Co-Processor 512KB Memory Expansion (#6161): Expands the Realtime Interface Co-Processor (#6160 and #6166) memory from 512KB to 1024KB. Only one 512KB Memory Expansion Option may be installed.

EIA RS-232-C Direct Attach Interface Cable Option (#6056): Allows the user to connect one port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

EIA RS-232-C Modem Attach Interface Cable (#6057): Allows the user to connect one port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

CCITT V.35 Interface Cable (#6061): Allows the user to connect one port of the Realtime Interface Co-Processor to a CCITT V.35 modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the CCITT V.35 Interface Board (#6053) is installed.

Specified Operating Environment

- Intel(1) 80186 Microprocessor
- 7.37 MHz clock speed
- 20-bit addressing
- 16-bit data path
- 128KB or 512KB Dynamic RAM
- 16KB ROM

Operating Environment

- **Electrical**
 - **Operating voltages:**
 - ▲ +5V DC
 - ▲ +12V DC
 - ▲ -12V DC
 - ▲ -5V DC
 - **Current requirements**
 - ▲ **Realtime Interface Co-Processor**
 - △ +5V DC at 2.1a
 - ▲ **RS-232-C/CCITT V.24 Interface Board**
 - △ +5V DC at 80ma
 - △ +12V DC at 35ma
 - △ -12V DC at 22ma
 - ▲ **RS-422-A Interface Board**
 - △ +5V DC at 120ma
 - ▲ **20ma Current Loop Interface Board**
 - △ +5V DC at 35ma
 - △ +12V DC at 52ma
 - △ -12V DC at 45ma
 - ▲ **CCITT V.35 Interface Board**
 - △ +5V DC at 150ma
 - △ -5V DC at 70ma
 - △ +12V DC at 15ma
 - △ -12V DC at 15ma

● **FCC Class A**

Installation of the Realtime Interface Co-Processor changes the FCC rating of the 5160 and 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. See the "IBM Realtime Interface Co-Processor Guide To Operations" for the FCC Statement.

Hardware Requirements: One of the following IBM system units is required for operation of the Realtime Interface Co-Processor.

- 5531 Industrial Computer Mdl 011 and 021
- 7531 Industrial Computer Mdl 041
- 7532 Industrial Computer Mdl 041
- 5160 Personal Computer Mdl 087, 068, 078, 267, 268, 277, 278, 088, and 089
- 5170 Personal Computer Mdl 068, 099, 239, 319, and 339

Software Requirements: The IBM Personal Computer Disk Operating System (DOS), version 2.1, 3.0, 3.1, or 3.2 is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit

processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- IBM Realtime Interface Co-Processor Technical Reference (#6058)
- Realtime Control Program DOS Support (Program No. 5669-177)
- Realtime Interface Co-Processor C Language Support (Program No. 5656-094)
- Realtime Interface Co-Processor Developer's Kit (Program No. 5669-176)

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512KB of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 5.25 inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128KB memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT
- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)

- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128KB or 512KB of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.
- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also

includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.
- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128KB or 512KB of memory, four or eight ports, and will be shipped with either 5.25 inch or 3.5 inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25 inch or 3.5 inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications

running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512KB Memory Expansion (#6242, P/N 00F5529): Replaces the 128KB of Co-Processor memory with 512KB of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512KB.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

(Canada only > 7531 INDUSTRIAL COMPUTER MODEL 111

PURPOSE

The IBM Industrial Computer family has been enhanced with the addition of a new model to the 7531 Industrial Computer. The new Model 111 provides the following enhancements:

- Increased performance
- Support for 3.5-inch diskette media
- New memory expansion options and memory module kits
- Enhanced keyboard support without requiring a keyboard installation diskette
- Support for 3278/79 emulation and 5250 emulation
- Lower priced configurations than with the existing Model 041
- Standard 20Mb fixed-disk

MODEL 111

Model 111: System Unit/Keyboard, 512Kb Memory, 20Mb Fixed-Disk, high capacity 1.2Mb Diskette Drive, ROM Based BASIC Language, clock/calendar with battery backup, diskette area cover door with keylock.

Prerequisites: The 7531 Industrial Computer Model 111 requires a video display adapter and device for display output, and a suitable operating system such as IBM Personal Computer DOS Version 3.2 or higher, IBM Operating System/2, or IBM Personal Computer XENIX (TM) Operating System Version 2.

XENIX is a trademark of Microsoft, Inc.

Limitations: The following adapters have software dependencies which are not supported by the IBM Personal Computer XENIX Operating System, and have not been validated for support by the IBM Operating System/2:

- Realtime Interface Co-Processor (#6050, #6165, #6160, #6166)
- Realtime Interface Co-Processor Multiport (#6240, #6241)
- PC Network Adapter (#0213)
- PC Cluster Adapter (#1206)
- BSC Adapter (#1204)
- SDLC Adapter (#1205)
- DAC Adapter (#1502)
- GPIB Adapter (#1503)
- Enhanced Display Station Emulation (#2910, #2911)
- Advanced 3278/79 Emulation Adapter (#5050)
- AT/370 Option Kit (#6115)
- IBM Token-Ring Network PC Adapters (#3391, #5063)
- Combination Adapter II (#6020)
- Remote Terminal Interface (#6078)

Customer Setup: The 7531 Industrial Computer Model 111 and its features are Customer Setup (CSU). Detailed setup instructions are included with each machine and feature. IBM set-up is available from the IBM National Service Division at the applicable rate and terms.

HIGHLIGHTS

- Increased performance using an 8 Mhz 80286 microprocessor
- New 3.5-inch 720Kb Diskette Drive Option,
- New 128/640Kb Memory Expansion Option,
- New 512Kb/2Mb Memory Expansion Option,
- New 1Mb/6Mb Memory Expansion Adapter,
- Support of Advanced 3278/79 Emulation Adapter,
- Support of Enhanced 5250 Display Station Emulation Adapter,
- Support of AT/370 Option Kit,
- Support of IBM Token-Ring Network Adapters,
- Enhanced Keyboard support does not require use of the keyboard installation diskette,
- Standard 20Mb fixed-disk drive,
- New Model 111 can be configured for a lower price than a similarly configured Model 041.

Compatibility: The 7531 Industrial Computer Model 111 is intended to be used in situations where the Model 041 is currently utilized.

DESCRIPTION

The newly announced model of the 7531 Industrial Computer provides increased performance for industrial applications, including IBM network functions and workstation emulation capabilities.

The new model is based on the high-performance 16-bit Intel 80286 Microprocessor. This model also includes the BASIC language and clock/calendar with battery backup.

The Model 111 system unit includes 512K bytes of standard memory, a single 1.2Mb High Capacity 5.25-inch Diskette Drive, a combination Fixed-Disk and Diskette Drive Adapter, and a 20Mb Fixed-Disk Drive.

Eight option (feature) slots support feature cards for devices, features, or memory. Six of the slots support either the advanced 16-bit or the 8-bit option cards. Two support 8-bit option cards only. However, the Model 111 uses one 16-bit slot for the standard combination fixed disk and diskette drive adapter. The result is seven available expansion slots. A retainer bar is provided to secure the feature cards.

Technical Information: The System Unit contains the following major functional components:

- Advanced high-performance Intel 80286 microprocessor at 8 Mhz clock speed
- 24-bit addressing
- 16-bit data path
- ROM based automatic power-on self test of system components
- BASIC language interpreter
- 64K bytes ROM
 - Access Time - 150 ns
 - Cycle Time - 355 ns
- 8086 compatible real address mode
- Limited protected virtual address mode functions
- 512K bytes of dynamic RAM on the system board
 - Access Time - 150 ns
 - Cycle Time - 275 ns
- Combination Fixed-disk and diskette drive adapter
- System clock/calendar/configuration w/CMOS RAM and battery backup
- Directionally-mounted speaker
- Diskette area cover door with protective keylock
- Bi-directional keyboard interface
- Enhanced Keyboard
- Power-on indicator (green)
- Eight expansion slots with retainer bar to secure feature cards
 - Six slots support either the advanced 16-bit or 8-bit option cards,
 - Two slots support 8-bit option cards only.
- Seven-Channel Direct Memory Access (DMA)
- 16-level interrupt
- Three programmable timers
- Cooling fan with removable filter
- 80287 math co-processor socket
- Dimensions of 7531:
 - Depth: 600mm (23.6 in.)
 - Width: 266mm (10.5 in.)
 - Height: 650mm (25.6 in.)
- Weight of 7531 Model 111: 38.6 Kg (85.1 lbs.)

Operating Environment:

- Electrical:
 - 192 watt switchable worldwide power supply
 - AC Operating Voltages:
 - ▲ 100-125V, 50-60 Hz

- ▲ 200-240V, 50-60 Hz
- Power line lightning surges of +/- 2500 volts
- Air Temperature:
 - System on: 0 degrees to 50 degrees C (32 degrees to 122 degrees F)
 - System off: 0 degrees to 55 degrees C (32 degrees to 131 degrees F)
 - Shipment (packaged): -40 degrees to 60 degrees C (-40 degrees to 140 degrees F) Note: The machine must be dry and fully acclimated to operating temperature prior to power on.
- Operational Altitude: Up to 2,135m (7,000 ft.)
- Relative Humidity:
 - System on or off: 8% to 85% non-condensing
 - Shipment (packaged): 5% to 100%
- FCC Class A
- Particulates Contaminants Filtering:
 - Suspended particulates: 500 micrograms per cubic meter
 - Benzene soluble organics: 30 micrograms per cubic meter
 - Settleable particulates: 1500 micrograms per square centimeter for 30 days
- Shock: 0.5G at 10 millisecond duration (1/2 sine wave)
- Vibration:
 - 5 to 10 Hz at 0.030 inches double amplitude displacement
 - 10 to 200 Hz at 0.15G peak
 - 200 to 500 Hz at 0.077G peak
- BTU Output: 1229 BTU/Hr

Publications

The following publications will be included with each system unit shipped:

- IBM 7531 Industrial Computer Operator's Guide (If additional publications are required can be purchased via feature code #6251 and #6252 respectively)
- IBM 7531 Installation and Setup (If additional publications are required can be purchased via feature code #6251 and #6252 respectively)

Additional publications available for purchase are:

- Technical Reference System Unit (#6256): The Technical Reference System Unit is for programmers, engineers and others who want to understand the 7531 Industrial Computer in greater detail. This reference manual includes functional specifications, BIOS listings, hardware specifications, and printouts for peripheral connectors.
- Technical Reference Options and Adapters (#6035): The Technical Reference Options and Adapters manual includes functional specifications for programmers, engineers and others who want to understand the 7531 Industrial Computer options and adapters in greater detail.
- Maintenance Information Manual (#6255): The Maintenance Information Manual is for service personnel and details many aspects of maintaining the machine. They include instructions for identifying the failure of a field replaceable unit (FRU), a parts catalog, and a copy of the Advanced Diagnostic Diskette.
- BASIC Reference Manual Version 3 (#0075).

SPECIAL FEATURES

Enhanced Display Station Emulation Adapter (#2911): This option provides for direct attachment of the IBM Industrial Computer to the System/34, System/36 and System/38, using the IBM Enhanced 5250 Emulation Program Version 2.12. It can attach remotely via the 5251 Model 12. The IBM Industrial Computer will emulate the 5250 work station family displays and printers. The IBM Industrial Computer can also be attached to the System/36 or System/38 remotely via the 5294 Remote Control Unit.

The Enhanced Display Station Emulation Adapter is a printed circuit card that is installed in one of the 7531 expansion slots. Also avail-

able are the integrated attachment cable for connecting the adapter to the twinax line (line termination resistors are part of the cable assembly), an Installation and Problem Determination Procedures Manual, and a 5-1/4 inch diskette containing diagnostic programs.

The design of the circuit card allows the IBM Industrial Computer to establish one or two sessions with the System/34, System/36 and System/38. Host device address(es) are set under program control.

The Enhanced 5250 Emulation Installation Convenience Kit (#2910) includes all parts, software and manuals required to install the Enhanced Display Station Emulation Adapter and Enhanced 5250 Emulation Program Version 2.12 in the IBM Industrial Computer.

For further information see IBM Announcement dated February 3, 1987.

128/640K Bytes Memory Expansion Option (#3338): This Memory Expansion Option comes with 128K bytes of memory. With the addition of the 512K bytes Memory Module Kit (#3339), this option can be expanded to 640K bytes.

When the Memory Expansion Option is installed fully populated (640K bytes), the user will have available 640K bytes of memory in the real address space and 512K bytes of memory in the protected address space.

For further information see IBM Announcement dated April 2, 1986.

512K Bytes Memory Module Kit (#3339): The Memory Expansion Module Kit option provides an additional 512K bytes memory on either the 128/640K bytes Memory Expansion Option (#3338) or the 512K bytes/2Mb Memory Expansion Option (#3343).

For further information see IBM Announcement dated April 2, 1986.

512KB/2MB Memory Expansion Option (#3343): This Memory Expansion Option comes with 512K bytes of memory. With additional 512K bytes Memory Module Kits (#3339), this option can be expanded to a maximum of 2Mb (the base option plus three Memory Module Kits).

A maximum of five 512Kb/2Mb Memory Expansion Options can be installed in a system unit providing 10 Mb of additional memory.

For further information see IBM Announcement dated April 2, 1986.

IBM Token-Ring Network PC Adapter Cable (#3390): The IBM Token-Ring Network PC Adapter Cable is a 2.4m (8 ft) attachment cable used to connect the #3391 or #5063 adapter to the network cabling system.

For further information see IBM Announcement dated April 16, 1986.

IBM Token-Ring Network PC Adapter (#3391): The IBM Token-Ring Network PC Adapter is a feature card for the attachment of the 7531 Industrial Computer to the IBM Token-Ring Network.

The IBM Token-Ring Network is a high-speed communications network for interconnecting information processing equipment at a local site. The network uses the IBM Cabling System, including Type 3 specified telephone media, for physical interconnection, and a token-ring access protocol for network traffic control. The IBM Token-Ring Network is a baseband token-ring local area network that conforms to the IEEE 802.5 and IEEE 802.2 standards and the ECMA 89 standards.

The IBM Token-Ring Network PC Adapter is a feature card which contains a microprocessor operating under control of adapter resident microcode. The adapter transmits and receives at a speed of 4 million bps using protocols conforming with IEEE 802.5 and ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard.

For further information see IBM Announcement dated October 15, 1985.

IBM 1MB to 6MB Memory Expansion Adapter (#3400): This multi-function adapter provides up to 6Mb of memory, split memory addressing, a parallel printer port and an asynchronous serial

communications port. The adapter comes with 1Mb of memory installed. Memory Module Kits can be added in increments of 1Mb up to a maximum of 6Mb per adapter. A maximum of three adapters may be installed, providing 16Mb of additional memory. The split memory addressing feature allows the base memory to be filled to the 640Kb limit with the remaining adapter memory automatically becoming part of the expansion memory area.

The asynchronous serial communications port is a 9-pin D-shell RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel printer port provides a 25-pin connector to connect a parallel printer.

One 16-bit expansion slot is required for each adapter. Adapters are customer installable. A maximum of two serial and two parallel ports are supported by the 7531 Industrial Computer.

For further information see IBM Announcement dated December 2, 1986.

1MB Memory Module Kit (#3402): Expands the memory capacity of the Memory Expansion Adapter (#3400) in increments of 1Mb up to a maximum of 6Mb per adapter. Each kit consists of two 512KB memory modules inserted into memory module sockets on the adapter card. A maximum of five kits can be added to each adapter card. Memory Module Kits are customer installable.

For further information see IBM Announcement dated December 2, 1986.

Advanced 3278/79 Emulation Adapter (#5050): The Advanced 3278/79 Emulation Adapter is a circuit card that plugs into any one of the expansion slots in the IBM Industrial Computer System Unit. A cable receptacle mounted on the card provides for attachment of a customer-supplied coaxial cable, IBM Cabling System media (3274 attachment only), or telephone twisted-pair via IBM/ROLM Coax-to-Twisted-Pair Adapter at the rear of the system unit. Most, but not all, functions of the emulated displays are supported.

The Advanced 3278/79 Emulation Adapter provides host communications support via 3278/79 emulation. When used with the IBM PC 3270 Emulation Program Entry Level or IBM equivalent, the Industrial Computer can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A with certain restrictions and can support file transfer with certain host systems. Both the host-controlled 3270 session and a local IBM Disk Operating System (DOS) session can be active concurrently and the user can interact with either session alternatively.

The 3270-PC File Transfer Program (5664-281 for Virtual Machine/System Product (VM/SP), 5665-311 VSE/SP 2.1.1, 2.1.2, or SSX/VSE 1.4.1, or IBM equivalent) is required for file transfer.

File transfer to the 4700 system is not supported.

The following are additional highlights of the Advanced 3278/79 Emulation Adapter:

- Distributed function terminal mode operation - Allows distribution of 3270 data stream processing from the control unit to the Industrial Computer and allows implementation of advanced capabilities such as multiple concurrent 3270 sessions. Requires corresponding capability in the upstream node (available with the 3274 Control Unit) and in an IBM Personal Computer 3270 Emulation program (available with 3270-PC Control Program). Additional information is available in the IBM Personal Computer 3278/79 Emulation Adapter Technical Reference for the Advanced Adapter.

- Low power usage

- Attachment of the IBM Industrial Computer to:

- IBM 3274 Control Unit
- IBM 4321 Processor Display/Printer Adapter
- IBM 4331 Processor Display/Printer Adapter
- IBM 4361 Processor Display/Printer Adapter

- IBM 4701 Finance Communication Controller

- No host hardware or host system software modifications required for 3270 emulated functions.

- Supports attachment to the 3274 via the 3299 Terminal Multiplexer.

For further information see IBM Announcement dated March 18, 1986.

IBM Token-Ring Network PC Adapter II (#5063): The IBM Token-Ring Network PC Adapter II, when operating with the IBM Token-Ring Network Bridge program, provides bridging of IBM Token-Ring Network rings. This increases the allowable number of attaching devices that communicate on an IBM Token-Ring Network within the establishment. The bridging of multiple rings provides the appearance of one logical ring with transparency to higher level protocols.

The IBM Token-Ring Network PC Adapter II can also be used for situations which require additional RAM for increasing message segment size and/or increasing the number of link stations supported by the adapter. For example, the IBM Token-Ring Network PC Adapter II in a server may improve performance when multiple workstations require simultaneous access to the server.

For further information see IBM Announcement dated April 16, 1986.

AT/370 Option Kit (#6115): This option, along with VM/PC 1.1, allows the 7531 Industrial Computer to be a System/370 work station. A 3278/79 Emulation Adapter (#5050) may be installed with this AT/370 Option Kit in the system unit for a host 3278/79 session and data transfer.

Highlights of the AT/370 Option Kit and VM/PC 1.1 are:

- Support of unique concurrent sessions via "hot key":
 - Local System/370 CMS session
 - Host 3278/79 session via an optional 3278/79 Emulation Adapter that will provide a coaxial connection to an:
 - ▲ IBM 3274 Control Unit
 - ▲ IBM 4321/4331/4361 Processor via a Display/Printer Adapter
 - ▲ IBM 4361 Processor via a Work Station Adapter
 - ▲ IBM 4701 Finance Communication Controller via a Device Cluster Adapter (host server functions not supported)
 - Remote 3101 emulation session with IBM Personal Computer 3101 Emulation licensed program (6024042) and serial/parallel adapter installed
 - System/370 Processor Control Session

- Ability to execute many unaltered host System/370 VM/CMS programs

- Hardware relocate to support up to 8Mb virtual addressing

- 7531 Industrial Computer functional capabilities unchanged after this option kit is installed.

The AT/370 Option Kit consists of two (PC/370-P2 and PC/370-M2) cards that allow the 7531 Industrial Computer to execute many of the System/370 instructions.

The PC/370-P2 card consists of three microprocessors, a page table and attendant circuitry.

The first microprocessor executes most of the commonly used fixed point System/370 instructions. It performs all instruction fetches and decoding and all effective address calculations. The general purpose registers (GPR) and program status word (PSW) are kept in this microprocessor.

The second microprocessor emulates the remaining non-floating point System/370 instructions, interprets the diagnose instruction,

manipulates the page table, handles exceptional conditions, and performs hardware housekeeping as required.

The third microprocessor executes System/370 floating point instructions. The floating point registers are kept in this microprocessor.

The page table consists of two static RAM devices arranged in a 2046 x 12 array. Each virtual page is assigned to an entry in the page table. Each entry contains its real page number and status bits.

The PC/370-M2 card contains 512Kb of parity checked RAM accessible from either the PC/370-P2 card or the microprocessor for the 7531 Industrial Computer. Concurrent requests for memory accesses are arbitrated.

This memory (512Kb) is viewed in native mode as a 128Kb storage area that begins at the end of the 512Kb of required memory in the 7531 Industrial Computer.

The PC/370-P2 card views the 512Kb memory as two separate areas which are not contiguously addressable. The area from 0 to 480Kb is addressed from 0 to 480Kb and is real System/370 space. The area from 480Kb to 512Kb is addressed from 0 to 32Kb and is control store for the second microprocessor on the PC/370-P2 card.

The optional features that are usable in a 7531 Industrial Computer with an AT/370 Option Kit and VM/PC 1.1 are:

- IBM Advanced 3278/79 Emulation Adapter (#5050)
- IBM 5532 Industrial Color Display via a Color/Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) for local or host 3279 Model 2A or S2A emulation sessions.
- IBM 7534 Industrial Graphics Display via a Color/Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) for local or host 3279 Model 2A or S2A emulation sessions.
- Memory Expansion Options (maximum three since the System/370 Processor, System/370 memory, and combination fixed disk and diskette adapter occupy three of the six sixteen-bit slots on the system board.
- Serial/parallel adapter
- 20Mb fixed disk drive
- High capacity diskette drive (1.2Mb)
- Double-sided diskette drive (360Kb)

Other optional features such as the following are not explicitly supported by the AT/370 Option Kit with VM/PC 1.1 but are supported in stand-alone (native) mode.

- Math Co-processor (#0211)
- PC Network Adapter (#0213)
- Prototype Adapter (#0220)
- Binary Synchronous Communications Adapter (#1204)
- Synchronous Data Link Control Communications Adapter (#1205)
- Cluster Adapter (#1206)
- Data Acquisition and Control Adapter (#1502)
- General Purpose Interface Bus Adapter (#1503)
- Enhanced Display Station Emulation Adapter (#2911)

For further information see IBM Announcement dated October 25, 1984.

3.5 Inch 720KB Diskette Drive (#6163): This feature is a half-high, double-sided 3.5 inch diskette drive supporting the 3.5 inch media with 720K bytes storage capacity.

The option provides data transfer between 5.25 inch and 3.5 inch media, allowing greater compatibility with other IBM equipment.

The drive uses the combination fixed-disk and diskette drive adapter, standard on the 7531 and 7532. The drive requires the IBM Disk Operating System (DOS) Version 3.2 or higher, and must be installed as drive B of the system unit.

With unlike diskette drives installed, special considerations are necessary if a backup copy or working copy of 5.25 inch diskettes are required. The backup or working copy will be on a 3.5 inch diskette that cannot be used in the 5.25 inch diskette drive A.

Supported Features: The new Model 111 supports most features and peripheral devices of the current 7531 Industrial Computer Model 041. These features and peripheral devices include:

Special Feature.	Feature Code
80287 Math Co-processor	#0211
Serial/Parallel Adapter	#0215
Serial Adapter Cable	#0217
Prototype Adapter	#0220
Serial Adapter Connector	#0242
PC Network, Adapter	#0213
Base Expander	#0230
Distance Kit	
Short	#0231
Medium	#0232
Long	#0233
Cabling Segments	
25-foot	#0234
50-foot	#0235
100-foot	#0236
200-foot	#0237
Enhanced Graphics Adapter	#1200
Graphics Memory Expansion Card	#1201
Graphics Memory Module	#1203
BSC Adapter	#1204
SDLC Adapter	#1205
PC Cluster Adapter	#1206
PC Cluster Cable Kit	#1207
DAC Adapter	#1502
Distribution Panel	#1504
GPIO Adapter	#1503
Communications Adapter Cable	#2067
Enhanced 5250 Emulation Installation	
Convenience Kit	#2910
Display Station Emulation Adapter	#2911
Integrated Attachment Cable	#2877
Memory Expansion	
128/640Kb Memory Expansion Option	#3338
512Kb/2Mb Memory Expansion Option	#3343
512Kb Memory Module Kit	#3339
1Mb to 6Mb Memory Expansion Adapter	#3400
1Mb Memory Module Kit	#3402
Color/Graphics Monitor Adapter	#4910
Advanced 3278/79 Emulation Adapter	#5050
Combination Adapter Cable	#6001
20Mb Fixed Disk Drive	#6250
Diskette Drive	
5.25 inch 1.2Mb	#6038
5.25 inch 360Kb	#6039
3.50 inch 720Kb	#6163
Realtime Interface Co-Processor	
with 128Kb in 5.25 inch media	#6050
with 128Kb in 3.5 inch media	#6165
with 512Kb in 5.25 inch media	#6160
with 512Kb in 3.5 inch media	#6166
512Kb Memory Expansion Option	#6161
EIA RS-232-C/CCITT V.24 Board	#6051
CCITT V.35 Board	#6053
128Kb Memory Expansion Option	#6055
EIA RS-232-C Direct Attach Cable	#6056
EIA RS-232-C Modem Attach Cable	#6057

MACHINES

CCITT V.35 Cable	#6061
EIA RS-422-A Board	#6064
20-mA Current Loop Board	#6066
Realtime Interface Co-Processor	
Multiport	
4 Ports, with 128Kb in	
5.25-inch media	#6240
4 Ports, with 128Kb in	
3.5-inch media	#6241
512Kb Memory Expansion Option	#6242
Multiport Four Port Addition	#6245
Multiport EIA RS-232C Interface	
Cable	#6246
Combination Adapter II	#6020
128Kb Memory Board for	
Combination Adapter II	#6040
Remote Terminal Interface	#6078
AT/370 Option Kit	#6115
IBM Token-Ring Network	

PC Adapter	#3391
IBM Token-Ring Network	
PC Adapter II	#5063
IBM Token-Ring Network	
PC Adapter Cable	#3390

Additional peripheral devices supported are:

- IBM 5532 Industrial Color Display
- IBM 7534 Industrial Graphics Display
- IBM 5178 PC Network Translator Unit

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE) <

7532 INDUSTRIAL COMPUTER

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

PURPOSE

The 7532 Industrial Computer is designed for information-handling applications in industrial plant floor environments, where a system more resistant to harsh physical conditions is required. The 7532 is installable inside a standard 19-inch rack. It is based on a high performance Intel 80286 microprocessor, and is equipped with a high capacity (1.2Mb) diskette drive, 512Kb of standard memory, keyboard, clock/calendar with battery backup, ROM-based BASIC language, and other advanced features.

MODELS

Model 041: System Unit/Keyboard, 512Kb Memory, high capacity 1.2Mb Diskette Drive, ROM Based BASIC Language, clock/calendar with battery backup, diskette area cover door with security keylock.

Prerequisites: The 7532 requires a video display adapter and device for display output. It is powered by a standard 115/230 volt, 50 Hz or 60 Hz power source (voltage can be switched by user). IBM Personal Computer DOS 3.0 or later is required (DOS 3.1 is required for the IBM PC Network).

Packaging: The system unit, keyboard, and options are packed in separate cartons. An additional carton contains the power cord, the 7532 Industrial Computer Installation and Setup manual, and the 7532 Industrial Computer Operator's Guide.

Limitations: Other 5531 Industrial Computer options, adapters, or devices not specifically listed or supported by the 7532 are not supported. Some of these non-supported items include:

- 64Kb Memory Module Kit (#1003)
- 64/256Kb Memory Expansion Option (#1013)
- 5531 Keyboard
- Asynchronous Communications Adapter (#2074)
- Binary Synchronous Communications Adapter (#2075)
- SDLC Communications Adapter (#2090)
- 10Mb Fixed Disk Drive (#2500)
- Fixed Disk Adapter (#2501)
- 5-1/4" Diskette Drive Adapter (#3780)
- 5-1/4" Dual-sided Diskette Drive (#3810)
- XT/370 Option Kit (#1509)
- Combination Adapter (#6000)
- Keylock Option Kit (#6002)

Customer Setup (CSU): The 7532 and its options are customer setup. CSU allowance is one day. Detailed setup instructions are included with each machine and option. Setup service is available from the IBM National Service Division at IBM hourly rates and minimums, or by a Contract Support Service (CSS) Agreement.

HIGHLIGHTS

Standard Features:

- Advanced high-performance Intel 80286 microprocessor
- ROM-based automatic power-on self-test of system components
- ROM-based BASIC language interpreter
- 8086 compatible real address mode
- Protected virtual address mode
- 512Kb of memory
- 1.2Mb high-capacity diskette drive

- Combination fixed disk and diskette adapter
- Fixed disk-in-use indicator light (yellow)
- System clock/calendar/system configuration storage with battery backup
- Sound system
- System reset button
- Diskette area cover door with security keylock
- Bidirectional keyboard interface
- Keyboard
- Switchable worldwide power supply with cooling fan
- Cooling fan with removable filter
- Power-on indicator light (green)
- Eight input/output (I/O) expansion slots with retainer bar to secure feature cards
- Socket for Intel 80287 Math Co-processor
- 24-bit addressing
- 16-bit data path
- Seven-channel direct memory access (DMA)
- 16-level interrupt
- Three programmable timers

Optional Accessories:

- Rack Mounting Slides (#6023)
- Keyboard Mounting Kit (#6024)

Compatibility: The following hardware products are supported on the 7532:

- 5532 Industrial Color Display
- 7534 Industrial Graphics Display
- 5178 PC Network Translator Unit

Note: The 5178 PC Network Translator Unit environmental specifications are lower than those of the 7532. Consequently, the translator unit must be installed in a location where the environmental conditions are similar to those of an office environment.

DESCRIPTION

The 7532 has been designed to meet industrial environmental conditions. These conditions can be summarized as follows:

- extended temperature operation
- extended vibration and shock operation
- extended voltage transients operation
- extended particulates operation

The 7532 provides plant floor personnel with a system capable of handling computer applications in the plant floor environment.

The 7532 is designed for installation inside a standard 19-inch rack. The standard 19-inch racks must meet EIA standards for 19-inch rack mounting. The standard 19-inch racks must comply with RS-310B (ANSI C83.9-1972) dimensional specifications and use the universal mounting rail hole pattern.

The 7532 Industrial Computer is based on a high performance 16/24-bit Intel 80286 microprocessor, and is equipped with a high capacity (1.2Mb) diskette drive, keyboard, ROM based BASIC language, clock/calendar with battery backup, diskette area cover door

with security keylock, and system reset button. Standard memory is 512Kb. The system may be further expanded to 640Kb with the 128Kb memory expansion or 128Kb memory board options or up to 3Mb with 512Kb memory options.

The system can be further expanded through additional customer setup options. One or two 20Mb Fixed Disk Drives, a second 1.2Mb High Capacity Diskette Drive, and a Dual-sided (320/360Kb) Diskette Drive are available. A maximum of two diskette drives and one fixed disk drive, or one diskette drive and two fixed disk drives can be installed in the system unit. These combinations result in direct access storage capacity of up to 41.2Mb.

DOS 3.0 supports the 20Mb Fixed Disk Drive and 1.2Mb High Capacity Diskette Drive in the 7532 system. With DOS 3.0, the 1.2Mb diskette drive will also read single- and dual-sided diskettes formatted at 160/180Kb and 320/360Kb capacity, respectively. The Dual-sided Diskette Drive (320/360Kb) option is available for downward diskette portability with the 5531 Industrial Computer and IBM Personal Computers.

To fully utilize the 1.2Mb High Capacity Diskette Drive, new diskette media is required. The media is available from the IBM Systems Supplies catalog with the following description:

IBM 5.25 Diskette 2HC, double-sided, high capacity,
96 tracks per inch, soft sector, P/N 6109660.

To order diskettes, contact IBM Direct, toll-free via 1-800-IBM-2468.

Eight option (feature) slots support feature cards for devices, features, or memory. Six of the slots support either the advanced 16-bit or 8-bit option cards. Two support 8-bit option cards only. However, the 7532 uses one 16-bit slot for the standard combination fixed disk and diskette drive adapter. The result is seven available expansion slots. A retainer bar is provided to secure the feature cards in-place.

Included are a cooling fan for the world-wide power supply, and a cooling fan with removable filter for the system unit features. The 7532 also includes a diskette area cover door with security keylock, which, when locked by the user, prevents initialization of the system, and entry of command/data from the keyboard.

The keyboard offers commonly used data and word processing functions along with separate typewriter and numeric keypads. Key-locations enhancements and mode indicators (Cap Lock, Numeric Lock, Scroll Lock) improve keyboard usability. Special symbols may be accessed with a combination of keys. Depending on the application program, from 10 to 40 special function keys may be supported.

The keyboard is attached to the 7532 via a ten-foot coiled cable, permitting a variety of workspace configurations. An optional keyboard mounting kit (#6024) is offered to install the keyboard in a standard 19-inch rack.

TECHNICAL INFORMATION

System Unit:

- INTEL 80286 microprocessor
- 6.0 MHz clock speed
- 24-bit addressing
- 16-bit data path
- 64Kb ROM

Access time - 150ns
Cycle time - 355ns

- Dimensions:

Depth - 513.4mm (20.2 in)
Width - 436.8mm (17.2 in)
Height - 221.0mm (8.7 in)

Weight - 21.3 Kg (47 lbs.)

SPECIFIED OPERATING ENVIRONMENT

- Electrical:
 - 192 watt power supply
 - AC Operating Voltages:
 - 90-137V, 50-60 Hz
 - 180-259V, 50-60 Hz
 - Power line lightning surges of +/- 2500 volts, as outlined in FCC Docket 19528 - Part 68
- Air Temperature:
 - System on: 0 degrees to 50 degrees C (32 degrees to 120 degrees F)
 - System off: 0 degrees to 55 degrees C (32 degrees to 131 degrees F)
- Relative Humidity: 8 per cent to 80 per cent non-condensing
- FCC Class A
- Particulates Contaminants Filtering:
 - Suspended particulates: 500 micrograms per cubic meter
 - Benzene soluble organics: 30 micrograms per cubic meter
 - Settleable particulates: 1500 micrograms per square centimeter for 30 days
- Shock: 0.5G at 10 millisecond duration
- Vibration:
 - 5 to 17 Hz at 0.005 inches double amplitude displacement
 - 17 to 200 Hz at 0.07G peak
 - 200 to 500 Hz at 0.036G peak
- BTU Output: 1229 BTU/Hr

Publications: The system will be shipped with two manuals:

- IBM 7532 Industrial Operator's Guide (#6036)
- IBM 7532 Industrial Computer Installation and Setup Manual (#6037)

The following manuals are available for purchase:

- IBM 7531/7532 Industrial Computer Technical Reference Manual System Unit (#6032)
- IBM 7531/7532 Industrial Computer Maintenance Information Manual (#6033)
- IBM Industrial Computer Technical Reference Options and Adapters (#6035)
- IBM Personal Computer BASIC Reference Manual Version 3.0 (#1132)

Technical Assistance: Customers who have signed an IBM Industrial Computer Volume Procurement Amendment (VPA) and have ordered twenty or more 7532 Industrial Computers may designate from one to three technical coordinators who may contact the Personal Computing Assistance Center (PCAC) for usage assistance. The usage assistance is available for the contract period.

Customer technical coordinators may participate in an education program administered by the PCAC. The education may be self-study or conducted in a classroom at a PCAC-selected location.

SPECIFY (NONE)

SPECIAL FEATURES

512Kb Memory Expansion Option (#0203): Adds memory above 1Mb, in 512Kb increments. Up to five options may be plugged into the I/O expansion slots of the system unit to provide a total of three megabytes of primary storage. Performance characteristics are the same as other 7532 user memory. Note: This option may not be used for address storage from 512Kb to 640Kb. The memory range from 640Kb to 1Mb is reserved for system functions. Each memory increment requires one 16-bit expansion slot.

128Kb Memory Expansion Option (#0209): Expands the memory from 512Kb to 640Kb. Performance characteristics are the same as other 7532 user memory. Only one #0209 may be installed. It requires a 16-bit expansion slot. Limitation: Cannot be installed with the 128Kb Memory Board for the Combination Adapter II (#6040).

Math Co-Processor (#0211): A high performance numeric 80287 processor extension with floating point, extended integer, and BCD data types, compatible with the Intel 8087 Math Co-Processor. When installed, the system fully conforms to the proposed IEEE Floating Point Standard and is an excellent facility for high-performance numeric processing. Only one #0211 can be installed in a system unit.

PC Network Adapter (#0213): The IBM PC Network is a low cost, broadband, local area network. It provides a reliable, low maintenance network using standard 75 ohm coaxial cable (CATV compatible) and standard broadband components. The network uses carrier sense multiple access/collision detect (CSMA/CD) protocol to transmit data at 2 million bits per second. The network consists of the IBM 5178 PC Network Translator Unit which provides single channel frequency translation for the network, the IBM PC Network Adapter (#0213) which attach IBM Industrial and Personal Computers to the network, and eight IBM PC Network Cabling Components which may be used to attach up to 72 IBM Industrial and Personal Computers within a 1,000-foot radius of the translator unit.

The IBM 5178 PC Network Translator Unit provides fixed frequency translation for the IBM PC Network. One translator unit is required for each network. The translator unit is supplied with a separately packaged 120-volt transformer which plugs into a standard grounded electrical outlet.

The IBM 5178 PC Network Translator Unit environmental specifications are lower than those of the 7532. Consequently, the translator unit must be installed in a location where the environmental conditions are similar to those of an office environment.

The translator unit has a connector assembly for attaching up to eight IBM Industrial or Personal Computers within a radius of 200 feet (cable segments may be purchased separately). The translator also has an expansion port for attaching the IBM PC Network Base Expander (#0230), which permits attachment of up to 64 additional Industrial or Personal Computers to the network, for a total of 72.

The IBM PC Network Adapter is a feature card that plugs into each IBM Industrial or Personal Computer in the network. It is supplied with a three-meter (9-foot) attachment cable which can be connected directly to, or within 200 feet of the IBM PC Network Translator Unit. The IBM PC Network Cabling Segments are used to extend the distance up to 200 feet.

The optional IBM PC Network Cabling Components contain a variety of preassembled wires and connectors that permit installation of a variety of network topologies. They are designed to extend the functional capabilities of the network. These cabling components can be used to increase the maximum number of attached stations from 8 to 72, and to increase the maximum distance of coverage from a radius of 200 feet to a radius of 1,000 feet. The cable component options which provide for end-to-end connection, include a Base Expander, three Expansion Kits, and four Cable Segments preassembled from standard CATV components. Standard F connectors are used to connect cable components.

The IBM PC Network Base Expander (#0230) is required to grow the network to more than eight IBM Industrial or Personal Computers

or more than a 200-foot radius from the translator unit. The base expander is a prerequisite for the attachment of up to eight Short, Medium, or Long Distance Kits in any combination. Each distance kit can attach up to eight IBM Industrial or Personal Computers. In addition, the medium and long distance kits extend the network by 400 feet and 800 feet, respectively. In combination with cabling segments, the short, medium, and long distance kits can extend the network up to a 1,000-foot radius from the translator unit.

- PC Network Cabling Components
- Base Expander (#0230)
- Distance Kit

Short (#0231)
Medium (#0232)
Long (#0233)

- Cabling Segments

25-foot (#0234)
50-foot (#0235)
100-foot (#0236)
200-foot (#0237)

Serial/Parallel Adapter (#0215): Provides a serial port and a parallel port. The serial portion is fully programmable and supports asynchronous communications from 50 to 9,600 baud. The back of the adapter has a nine-pin D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. A maximum of two Serial/Parallel Adapters may be installed. Only one Serial/Parallel Adapter may be installed if a Combination Adapter II (#6020) is installed. Each requires one expansion slot of either type. Note: This adapter does not support current loop operation.

Prototype Adapter (#0220): This adapter is 4.8 inches high by 13.12 inches long. Two card edge tabs, one 2 by 31 positions and one 2 by 18 positions, provide all system control signals and voltages. No components are shipped with this card.

The adapter contains a voltage bus (+5 Vdc) and a ground bus (0 Vdc). Each bus borders the adapter with the ground bus on the component side and the voltage bus on the pin side. A system interface (wiring only) is also provided with a space for a jumper to specify whether the device has an 8- or a 16-bit data bus. This adapter also accommodates a D-shell connector from 9 to 37 positions. A recommended system interface logic diagram is available along with a list of recommended components to be used to interface custom logic to the 7532. Up to five Prototype Adapters can be installed in a system unit. Each requires a 16-bit expansion slot.

Enhanced Graphics Adapter (#1200): Provides support for the new 7534 Industrial Graphics Display and enhanced support for the 5532 Industrial Color Display. It requires one expansion slot of either type. The IBM Graphics Memory Expansion Card (#1201) expands the IBM Enhanced Graphics Adapter's 64Kb memory to 128Kb and increases the color range for 640 x 350 graphics from four colors to 16 colors. The IBM Graphics Memory Module Kit (#1203) expands the expansion's card memory to 256Kb providing additional graphics function.

The Enhanced Graphics Adapter:

- Supports the 5532 Industrial Color Display or the new 7534 Industrial Graphics Display.
- Allows full 16-color graphics with the 5532 Industrial Color Display in either 320 x 200 medium definition graphics or 640 x 200 high definition graphics modes.
- Provides 640 x 350 support in up to 16 colors for graphics on the new 7534 Industrial Graphics Display.

MACHINES

- Provides high quality (8 x 14 character box) text in color on the new 7534 Industrial Graphics Display.
- Allows users to select under program control from a palette of 64 colors when connected to the new 7534 Industrial Graphics Display.
- Provides 64Kb graphics memory on the IBM Enhanced Graphics Adapter expandable to 128Kb with the Graphics Memory Expansion Card.
- Expands graphics memory to 256Kb with the Graphics Memory Module Kit. This added memory may be used to support smooth scrolling, panning (scanning sequentially through graphics memory), and additional pages of graphics data.
- Allows compatibility modes to execute programs written for the IBM Color/Graphics Monitor Adapter with the 5532 Industrial Color Display. Composite video support for attaching analog monitors or TV sets is not provided.
- Allows RAM-resident character generator to be loaded from user programs allowing any set of 256 characters to be incorporated into applications.
- Allows character space expansion to 512 with the IBM Graphics Memory Expansion Card and to 1024 with the IBM Graphics Memory Module Kit.
- Allows character box sizes up to 32 dots high and 8 dots wide.

Binary Synchronous Communications Adapter (#1204): Provides an EIA RS-232-C interface. It is compatible with the 7531 Industrial Computer, the 5531 Industrial Computer, the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM Personal Computer AT. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter (#1205) is installed. Each adapter requires one expansion slot of either type.

SDLC Communications Adapter (#1205): Provides an EIA RS-232-C interface. It is compatible with the 7531 Industrial Computer, the 5531 Industrial Computer, the IBM Personal Computer, the IBM Personal Computer XT, the IBM Portable Personal Computer, and the IBM Personal Computer AT. Only one SDLC Adapter may be installed. It requires one expansion slot of either type.

PC Cluster Adapter (#1206): To connect the 7532, in a clustered multi-user configuration, consisting of other 7532s, 7531 Industrial Computers, 5531 Industrial Computers and IBM Personal Computers. This option supports up to 64 computers in a cluster (actual number is dependent on performance characteristics). Each computer in the cluster beyond the first two requires an additional PC Cluster Cable Kit (#1207). The adapter requires one expansion slot of either type.

Data Acquisition and Control Adapter (#1502): An analog and digital I/O card that can be plugged directly into the system unit. This option can be used in a scientific/industrial laboratory setting to control processes, monitor transducers (flow, pressure, temperature, etc.), and automate electronic testing. It requires one expansion slot of either type.

The IBM Data Acquisition and Control Adapter Distribution Panel (#1504) is an optional feature that provides easy access to the I/O signals, voltages, and grounds of the IBM Data Acquisition and Control Adapter. The distribution panel is connected to the adapter by a shielded cable. The distribution panel is a printed circuit board with four barrier-type screw terminal strips for a total of 88 terminations. A shielded flat cable with a 60-pin connector is permanently attached to the board. The cable and terminal board assembly is housed in a metal enclosure that is slotted to allow user cabling to enter or exit. The cable is approximately 34 inches long.

Up to four IBM Data Acquisition and Control Adapters can be attached to the 7532.

The Adapter has:

- Four analog input channels (12-bit resolution)

- Two analog output channels (12-bit resolution)
- 16-channel digital input port
- 16-channel digital output port
- Programmable sampling rates provided by a 32-bit timer
- Event counter, programmable rate generator, or programmable time delay provided by a 16-bit user timer/counter

The Distribution Panel has:

- Screw terminals provided to attach devices to the distribution panel
- Multiple grounds for twisted pair terminations
- Shielded construction to minimize noise interference.

Application areas that may be addressed with the IBM Data Acquisition and Control Adapter include:

- Chromatography
- Electrochemistry
- Energy management
- Electronic testing
- Process control
- Data logging
- Robotics

Some parameters commonly monitored or controlled include:

- Pressure
- Flow
- Temperature
- Displacement
- Voltage
- Light intensity
- Rotational speed

Some examples of instruments or devices that may utilize the Adapter are:

- Chromatographs
- Spectrophotometers
- Pressure gauges
- Relay controls
- Thermocouples
- Gas analyzers
- Humidity sensors
- Valve actuators
- Level gauges
- Load cells
- Conductivity cells
- pH meters

General Purpose Interface Bus Adapter (#1503): Provides an interface between the 7532 and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of multiple devices or instruments (such as plotters, multimeters, and disk drives). Up to four GPIB Adapters can be installed in a system unit. Each adapter requires one expansion slot of either type. The IBM GPIB Adapter can perform as a controller, a talker, or a listener with compatible devices. The IBM GPIB Adapter also provides capabilities for data transfer between work stations, and the connection of several computers for sharing of instruments or peripheral I/O devices.

The IBM GPIB Adapter is designed to the ANSI/IEEE-488 standard, including the 488A-1980 supplement, and:

- Supports up to 14 devices or instruments
- Provides a direct memory access data rate of up to 300Kb/second
- Provides a programmed I/O data rate of up to 20Kb/second
- Allows user selection of direct memory access channels
- Allows user to select interrupt level

Communications Adapter Cable (#2067): This cable allows the user to connect the Binary Synchronous Communications Adapter (#1204) or the SDLC Communications Adapter (#1205) to a modem via a plug at the rear of the 7532. The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable.

IBM Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Industrial Computer with a network adapter to the IBM Cabling System.

Color/Graphics Monitor Adapter (#4910): To attach a color display to the 7532, either a "direct-drive RGB" signal or a "composite" video signal can be selected. The display can be a direct-drive 5532 Industrial Color Display, 7534 Industrial Graphics Display, video monitor, or, through a customer-supplied RF modulator, a standard TV set. Either a color or black and white monitor or TV can be attached. 16 foreground and 8 background colors are supported in text (character) mode. This attachment also provides support for 4-color medium definition graphics (320 dots horizontal, 200 dots vertical) and black and white high-definition graphics (640 dots horizontal, 200 dots vertical). 256 characters are available in "text" mode, 128 in medium or high definition graphics. The adapter provides 16Kb of built-in memory to store multiple display screen contents and supports a customer-supplied light-pen. It requires one expansion slot of either type.

IBM Token-Ring Network PC Adapter II (#5063): Allows the IBM Industrial Computer to be attached to the IBM Token-Ring Network. Includes the adapter card, diskette and supporting documentation. The diskette includes adapter and ring diagnostics and an adapter handler program that provides a programming interface to the adapter. Customer Installation: Yes. Prerequisites: Requires a full-sized system expansion slot, the IBM Personal Computer Disk Operating System (DOS) and an attachment cable (#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media.

20Mb Fixed Disk Drive (#6019)(#6045): Two optional fixed disk drives may be installed on the 7532, providing a total of 40Mb of fixed disk storage capacity. Space and power are provided in the system unit for the drive(s). All fixed disk or diskette drives use the standard combination fixed disk and diskette drive adapter in the system unit. A dedicated landing zone for the read/write heads is available to protect the file and its contents during shipping, movement, or storage. The number of fixed disk drives and diskette drives must not exceed three. No more than two fixed disk drives can be installed in a system unit.

Characteristics:

- 20Mb of storage
- 512 bytes per sector
- 17 sectors per track
- 75 ms average access time
- 3600 RPM
- 5M bit per second transfer rate
- Dimensions:
 - Height - 82.55mm (3.25 in.)
 - Width - 146.05mm (5.75 in.)
 - Depth - 203.20mm (8.00 in.)
 - Weight - 2.3 Kg (5.1 lbs.)

Combination Adapter II (#6020): Provides the 7532 with four main functions: an asynchronous communications interface, a parallel printer interface, a programmable timer, and a thermal sensor interface. The adapter requires one 16-bit expansion slot.

The asynchronous communications interface is fully programmable and supports asynchronous communications only. All of the specifications of this interface match those of the Serial/Parallel Adapter (#0215). In addition, the serial interface can be configured to support an RS-422 interface. The cable interface to the asynchronous communications port is via a 9-pin connector at the rear of the system unit. The Combination Adapter Cable (#6001) is required to convert the 9-pin Asynchronous Communications port of the Combination Adapter II to a 25-pin "D" shell, male type connector for attachment to an external modem or other asynchronous devices.

The cable is double shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable.

The parallel printer interface is specifically designed to attach printers with a parallel interface. All of the specifications of this interface match those of the Serial/Parallel Adapter (#0215).

The programmable timer has a counter resolution of 4/1,000 of a second.

The thermal sensor interface connects to a thermal sensor inside the system unit and allows the system processor to sense when the system unit is over its specified temperature range. A bit in the sensor port is set by the thermal sensor to indicate to the system software (DOS) that the system unit is over its specified temperature range.

High Capacity Diskette Drive (#6038): This is a half-high, 5-1/4-inch, dual-sided drive with 1.2Mb storage capacity. Space and power have been provided in the system unit for up to two drives. The drive is fully self-contained and consists of a spindle drive system, a read positioning system and a read/write/erase system.

One of these drives is standard in the 7532. An optional second drive may be installed in the system unit adjacent to the first if the space is not occupied by another diskette drive. Both drives use the standard combination fixed disk and diskette drive adapter in the system unit. The number of fixed disk drives and diskette drives must not exceed three.

The drive uses the new 96-TPI, high density media. In addition, it will read or write 48-TPI, single- or dual-sided media written for the 5531 Industrial Computer and IBM Personal Computers, giving a high level of compatibility with existing applications. However, once the 48-TPI media has been written in this drive, it may only be read by a high capacity diskette drive.

Characteristics:

- 1.2Mb storage
- 512 bytes per sector
- 15 sectors per track
- 96 tracks per inch
- Two sides
- 80 tracks per side
- 360 RPM
- Supports 300 and 500K bits/second data transfer rate
- 94ms average access time in 96-TPI mode
- Dimensions:
 - Height - 42.9mm (1.7 in.)
 - Width - 149.0mm (5.9 in.)
 - Depth - 202.1mm (8.0 in.)
 - Weight - 1.6 Kg (3.5 lbs.)

Dual-sided Diskette Drive (#6039): This diskette drive permits the exchange of 320/360Kb diskette media between the 7532, the 5531 Industrial Computer, and IBM Personal Computers. It is a half-high, 5-1/4-inch, dual-sided drive with a 320/360Kb storage capacity. Space and power for one drive have been provided in the system unit. The drive is fully self-contained and consists of a spindle drive system, a read positioning system, and a read/write/erase system.

This drive is installed in the system unit adjacent to the standard high capacity diskette drive if the space is not occupied by another diskette drive. This drive uses the standard combination fixed disk and diskette drive adapter in the system unit. The number of fixed disk drives and diskette drives must not exceed three.

Characteristics:

- 320/360Kb of storage
- 512 bytes per sector
- 8/9 sectors per track
- Two sides
- 91ms average access time
- 40 tracks per surface
- 48 tracks per inch
- 300 RPM
- Transfer rate of 250K bits/second
- Dimensions:
 - Height - 42.9mm (1.7 in.)

Width - 149.0mm (5.9 in.)
Depth - 202.1mm (8.0 in.)
Weight - 1.6 Kg (3.5 lbs.)

128Kb Memory Board for the Combination Adapter II (#6040): Plugs into the Combination Adapter II (#6020) and expands the memory from 512Kb to 640Kb without requiring an expansion slot. Performance characteristics are the same as other 7532 user memory. Only one 128Kb Memory Board may be installed on a Combination Adapter II. Limitation: Cannot be installed with 128Kb Memory Expansion (#0209).

IBM Realtime Interface Co-Processor (#6050, #6160, #6165, #6166): The IBM Realtime Interface Co-Processor is an interface subsystem for IBM Industrial Computers and IBM Personal Computers. A Realtime Interface Co-Processor (ARTIC) in conjunction with its software support provides support for attachment of Programmable Controllers in industrial applications.

The IBM Realtime Interface Co-Processor will be available with either 128KB or 512KB of standard memory and either 5.25-inch or 3.5-inch program media.

● Standard Features:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128KB or 512KB of dual-ported memory with parity for error detection (128KB expandable to 256KB, 512KB expandable to 1024KB)
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the co-processor storage and its interface ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Two serial I/O ports
- Data rates up to 64K bps full duplex with external clocking on one port, while the second port is operated at 19.2K bps full duplex.
- Transmit and Receive status-indicators
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support
- CRC generation and checking
- Pluggable Interface Boards
- Custom Interface Board support
- Byte-wide I/O Interface available at Interface Board Connector
- All external signals available at Interface Board connector
- Five programmable hardware timers
- Watchdog timer
- Watchdog timer status-indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - ▲ Hardware setup
 - ▲ Software setup
 - ▲ Problem determination procedures
 - ▲ Customer diagnostics diskette.
- Realtime Control Program microcode
 - ▲ Multi-tasking, preemptive priority
 - ▲ Co-Processor memory management
 - ▲ Timer support
 - ▲ Watchdog timer support
 - ▲ Queue management
 - ▲ Inter-task communications
 - ▲ Initial Program Load.
- ROM-based automatic power-on self-test of co-processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

● Optional Features:

- EIA RS-232-C/CCITT V.24 Interface Board (#6051)
- EIA RS-422-A Interface Board (#6064)
- CCITT V.35 Interface Board (#6053)
- 20ma Current Loop Interface Board (#6066)

- Realtime Interface Co-Processor 128KB Memory Expansion (#6055) (can only be used with features #6050 and #6165)
- Realtime Interface Co-Processor 512KB Memory Expansion (#6161) (can only be used with features #6160 and #6166)
- RS-232-C Direct Attach Interface Cable (#6056)
- RS-232-C Modem Attach Interface Cable (#6057)
- IBM Realtime Interface Co-Processor Technical Reference (#6058)
 - ▲ Hardware technical information
 - ▲ Realtime Control Program microcode description
 - ▲ Interface Board design information.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (#6059)
 - ▲ Problem determination procedures
 - ▲ Advanced Diagnostics Diskette
 - ▲ Wrap connector
- CCITT V.35 Interface Cable (#6061)

The Realtime Interface Co-Processor has been designed for use in industrial applications of the IBM Industrial Computers and IBM Personal Computers. The Co-Processor is compatible with the 5531, 7531, 7532, 5160, and 5170 computer systems. The 5531 Industrial Computer and 5160 Personal Computer are based on the Intel(1) 8088 microprocessor. The 7531 and 7532 Industrial Computers and 5170 Personal Computer are based on the Intel(1) 80286 microprocessor.

The Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are two independent serial ports that operate at speeds up to 64K bps using direct memory access. One port can operate at 64K bps full duplex, while the second is operated at a maximum of 19.2K bps full duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the Co-Processor is designed to accept two optional interface boards or user developed custom interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the Interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20ma Current Loop Interface Board
- CCITT V.35 Interface Board.

A maximum of two Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be found in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit mode on the 5531 and 5160 and in 8-bit or 16-bit mode on the 7531, 7532 and 5170.

The Realtime Interface Co-Processor will be available in two memory capacities, 128KB and 512KB, and will be shipped with either 5.25-inch or 3.5-inch program media.

- IBM Realtime Interface Co-Processor with 128KB of memory and 5.25-inch program media (#6050)
- IBM Realtime Interface Co-Processor with 128KB of memory and 3.5-inch program media (#6165)
- IBM Realtime Interface Co-Processor with 512KB of memory and 5.25-inch program media (#6160)

- IBM Realtime Interface Co-Processor with 512KB of memory and 3.5-inch program media (#6166)

All Realtime Interface Co-Processor features are functionally equivalent. Features #6050 and #6165 are shipped with 128KB of memory, upgradeable to 256KB, and features #6160 and #6166 are shipped with 512KB of memory, upgradeable to 1024KB. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128KB Memory Expansion Option (#6055) (Can only be used with features #6050 and #6165)
- 512KB Memory Expansion Option (#6161) (can only be used with features #6160 and #6166)

Detailed technical information on the Realtime Interface Co-Processor is provided in the optional Realtime Interface Co-Processor Technical Reference (#6058).

Realtime Control Program: The Realtime Control Program is microcode for the Realtime Interface Co-Processor. It is included with the Co-processor feature and is shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The Realtime Control Program microcode provides a realtime, multi-tasking operational environment for supporting user applications running on the Realtime Interface Co-Processor. The Realtime Control Program microcode is loaded from the system unit memory to the Realtime Interface Co-Processor memory. Once loaded, the Realtime Control Program microcode initializes itself and the Realtime Interface Co-Processor. It then signals the system unit processor that it is loaded and ready.

The Realtime Control Program microcode supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the Realtime Control Program microcode may communicate with another task running under the control program or with an application program running in the system unit.

The Realtime Control Program microcode provides support for interfacing IBM Industrial Computer or Personal Computer applications to the Realtime Control Program microcode and uses the IBM PC Macro Assembler as the program-preparation facility.

The Realtime Control Program microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 256 software timers with increments ranging from 5 ms to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Intertask communications is accomplished by the wait/post mechanism. Data may be passed between tasks by user queues.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Realtime Interface Co-Processor upon failure. It will also switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the Realtime Control Program microcode is provided in the optional Realtime Interface Co-Processor Technical Reference (#6058).

The Realtime Interface Co-Processor can coexist with the following IBM Industrial and Personal Computer adapters:

- 64/256KB Memory Expansion Option (#1013)
- 128KB Memory Expansion (#0209)
- 512KB Memory Expansion (#0203)
- PC Network Adapter (#0213)
- Enhanced Color Graphics Adapter (#1200)
- Combination Adapter II (#6020)
- Binary Synchronous Communications Adapter (#1204)
- SDLC Communications Adapter (#1205)
- Asynchronous Communications Adapter (#2074)
- Personal Computer Cluster Adapter (#1206)

- Data Acquisition and Control Adapter (#1502)
- General Purpose Interface Bus Adapter (#1503)
- Color/Graphics Monitor Adapter (#4910)
- Serial/Parallel Adapter (#0215)
- 10MB Fixed Disk Drive/Adapter Kit (#6018)
- Printer Adapter (#5200)
- Monochrome Display and Printer Adapter (#4900)
- 3278/79 Emulation Adapter (#2507)
- XT/370 Option Kit (#3891)
- Token-Ring Network PC Adapter (#9100)
- Voice Communications Adapter (#4839)
- Game Control Adapter (#1300)
- Enhanced Display Station Emulation Adapter (#2879)
- 5253 Emulation Installation Convenience kit (#2882)
- 5250 Emulation Convenience Kit (#2886)
- AT/370 Option Kit (#6115)
- XT/370 Option Kit (#1509)

Publications: The Realtime Interface Co-Processor will be shipped with one manual:

- "IBM Realtime Interface Co-Processor Guide to Operations"

The Guide to Operations covers the Realtime Interface Co-Processor and the optional Interface Boards and cables. The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Realtime Interface Co-Processor, optional Interface Boards, and cables. This publication is intended for anyone who will be installing, using, or programming the Realtime Interface Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available from Mechanicsburg.

The following manuals are available for purchase:

- "IBM Realtime Interface Co-Processor Technical Reference" (#6058)

The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Also included is detailed technical information on Interface Board design. It describes the interface between the Realtime Interface Co-Processor and the pluggable Interface Board. Detailed information on the programmer interfaces to the Realtime Control Program microcode is included.

The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Realtime Interface Co-Processor, Realtime Control Program microcode, optional Interface Boards and cables.

- "IBM Realtime Interface Co-Processor Hardware Maintenance and Service" (#6059)

The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Realtime Interface Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and a 15-pin wrap-connector for use when running Co-Processor diagnostics.

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed in the "Compatibility" section of this document are not supported.

The Realtime Interface Co-Processor is not designed to run DOS applications but is intended for industrial applications written to interface with the Realtime Control Program microcode.

In most system configurations, one Realtime Interface Co-Processor can be installed in the 5531 and 5160 computers, and up to three can be installed in the 7531, 7532, and 5170 Computers. For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 80286-based IBM Industrial and Personal computers prohibits an 8-bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a 16-bit adapter (Realtime Interface Co-Processor) within the same region.

See the "IBM Realtime Interface Co-Processor Technical Reference" for complete details.

Prerequisites: The Realtime Interface Co-Processor must be installed in one of the following systems:

- 5531 Industrial Computer
- 7531 Industrial Computer
- 7532 Industrial Computer
- 5160 Personal Computer
- 5170 Personal Computer

Customer Setup (CSU): The Realtime Interface Co-Processor and all options are customer setup (CSU). CSU allowance is one (1) day. Detailed setup instructions are included with each co-processor card. IBM setup is available at the applicable IBM hourly service rates and minimum charges.

Special Features:

EIA RS-232-C/CCITT V.24 Interface Board (#6051): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.

EIA RS-422-A Interface Board (#6064): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4000 ft, however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

CCITT V.35 Interface Board (#6053): Adapts one of the Co-Processor's serial ports for compatibility with CCITT V.35 interfaces.

20ma Current Loop Interface Board (#6066): Adapts one of the Co-Processor's serial ports for compatibility with 20ma interfaces. The current loop Interface Board also has the capability to provide the 20ma current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

Realtime Interface Co-Processor 128KB Memory Expansion (#6055): Expands the Realtime Interface Co-Processor (#6050 and #6165) memory from 128KB to 256KB. Only one 128KB Memory Expansion Option may be installed.

Realtime Interface Co-Processor 512KB Memory Expansion (#6161): Expands the Realtime Interface Co-Processor (#6160 and #6166) memory from 512KB to 1024KB. Only one 512KB Memory Expansion Option may be installed.

EIA RS-232-C Direct Attach Interface Cable Option (#6056): Allows the user to connect one port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

EIA RS-232-C Modem Attach Interface Cable (#6057): Allows the user to connect one port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

CCITT V.35 Interface Cable (#6061): Allows the user to connect one port of the Realtime Interface Co-Processor to a CCITT V.35 modem. The cable is shielded and is approximately 2m (6 ft) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the CCITT V.35 Interface Board (#6053) is installed.

Specified Operating Environment:

- Intel(1) 80186 Microprocessor
- 7.37 MHz clock speed
- 20-bit addressing
- 16-bit data path
- 128KB or 512KB Dynamic RAM
- 16KB ROM

Operating Environment:

- Electrical

- Operating voltages:

- ▲ +5V DC
- ▲ +12V DC
- ▲ -12V DC
- ▲ -5V DC

- Current requirements

- ▲ Realtime Interface Co-Processor
 - △ +5V DC at 2.1a
- ▲ RS-232-C/CCITT V.24 Interface Board
 - △ +5V DC at 80ma
 - △ +12V DC at 35ma
 - △ -12V DC at 22ma
- ▲ RS-422-A Interface Board
 - △ +5V DC at 120ma
- ▲ 20ma Current Loop Interface Board
 - △ +5V DC at 35ma
 - △ +12V DC at 52ma
 - △ -12V DC at 45ma
- ▲ CCITT V.35 Interface Board
 - △ +5V DC at 150ma
 - △ -5V DC at 70ma
 - △ +12V DC at 15ma
 - △ -12V DC at 15ma

- FCC Class A: Installation of the Realtime Interface Co-Processor changes the FCC rating of the 5160 and 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. See the "IBM Realtime Interface Co-Processor Guide To Operations" for the FCC Statement.

Hardware Requirements: One of the following IBM system units is required for operation of the Realtime Interface Co-Processor.

- 5531 Industrial Computer Mdl's 011 and 021
- 7531 Industrial Computer Mdl 041
- 7532 Industrial Computer Mdl 041
- 5160 Personal Computer Mdl's 087, 068, 078, 267, 268, 277, 278, 088, and 089
- 5170 Personal Computer Mdl's 068, 099, 239, 319, and 339

Software Requirements: The IBM Personal Computer Disk Operating System (DOS), version 2.1, 3.0, 3.1, or 3.2 is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Per-

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sonal Computer C Language. Applications for the system unit processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- IBM Realtime Interface Co-Processor Technical Reference (#6058)
- Realtime Control Program DOS Support (Program No. 5669-177)
- Realtime Interface Co-Processor C Language Support (Program No. 5656-094)
- Realtime Interface Co-Processor Developer's Kit (Program No. 5669-176)

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512KB of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 5.25-inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 3.5-inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128KB memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT
- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128KB or 512KB of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.
- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.
- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128KB or 512KB of memory, four or eight ports, and will be shipped with either 5.25-inch or 3.5-inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25-inch or 3.5-inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM

initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512KB Memory Expansion (#6242, P/N 00F5529): Replaces the 128KB of Co-Processor memory with 512KB of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512KB.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

MODEL CONVERSIONS (NONE)

ACCESSORIES

Rack Mounting Slides (#6023): Used to install the 7532 and the Keyboard Mounting Kit (#6024) in a standard 19-inch rack. The slides adjust in length from 56 cm (22 in.) to 76 cm (30 in.).

Keyboard Mounting Kit (#6024): Used to mount the keyboard in a standard 19-inch rack. The kit requires the Rack Mounting Slides (#6023).

IBM IBM Canada Ltd.

MACHINES

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SUPPLIES (NONE)

(Except LAD > 7532 INDUSTRIAL COMPUTER MODEL 111

PURPOSE

The IBM Industrial Computer family has been enhanced with the addition of a new model of the 7532 Industrial Computer. The Model 111 provides the following enhancements:

- Increased performance
- Support for 3.5-inch diskette media
- New memory expansion options and memory module kits
- Enhanced keyboard support without requiring a keyboard installation diskette
- Support for 3278/79 emulation and 5250 emulation
- Lower priced configurations than with the existing Model 041
- Standard 20Mb fixed-disk

MODEL 111

Model 111: System Unit/Keyboard, 512Kb Memory, 20Mb Fixed-Disk, high capacity 1.2Mb Diskette Drive, ROM Based BASIC Language, clock/calendar with battery backup, diskette area cover door with keylock.

Prerequisites: The 7532 Industrial Computer Model 111 requires a video display adapter and device for display output, and a suitable operating system such as IBM Personal Computer DOS Version 3.2 or higher, IBM Operating System/2, or IBM Personal Computer XENIX (TM) Operating System Version 2.

XENIX is a trademark of Microsoft, Inc.

Limitations: The following adapters have software dependencies which are not supported by the IBM Personal Computer XENIX Operating System, and have not been validated for support by the IBM Operating System/2:

- Realtime Interface Co-Processor (#6050, #6165, #6160, #6166)
- Realtime Interface Co-Processor Multiport (#6240, #6241)
- PC Network Adapter (#0213)
- PC Cluster Adapter (#1206)
- BSC Adapter (#1204)
- SDLC Adapter (#1205)
- DAC Adapter (#1502)
- GPIB Adapter (#1503)
- Enhanced Display Station Emulation (#2910, #2911)
- Advanced 3278/79 Emulation Adapter (#5050)
- AT/370 Option Kit (#6115)
- IBM Token-Ring Network PC Adapters (#3391, #5063)
- Combination Adapter II (#6020)
- Remote Terminal Interface (#6078)

Customer Setup: The 7532 Industrial Computer Model 111 and its features are Customer Setup (CSU). Detailed setup instructions are included with each machine and feature. IBM set-up is available from the IBM National Service Division at the applicable rate and terms.

HIGHLIGHTS

- Increased performance using an 8 Mhz 80286 microprocessor
- New 3.5-inch 720Kb Diskette Drive Option
- New 128/640Kb Memory Expansion Option
- New 512Kb/2Mb Memory Expansion Option
- New 1Mb/6Mb Memory Expansion Adapter
- Support of Advanced 3278/79 Emulation Adapter
- Support of Enhanced 5250 Display Station Emulation Adapter
- Support of AT/370 Option Kit
- Support of IBM Token-Ring Network Adapters
- Enhanced Keyboard support does not require use of the keyboard installation diskette
- Standard 20Mb fixed-disk drive
- New Model 111 can be configured for a lower price than a similarly configured Model 041

Compatibility: The 7532 Industrial Computer Model 111 is intended to be used in situations where the Model 041 is currently utilized.

DESCRIPTION

Model 111 of the 7532 Industrial Computer provides increased performance for industrial applications, including IBM network functions and workstation emulation capabilities.

Model 111 is based on the high-performance 16-bit Intel 80286 Microprocessor. This model also includes the BASIC language and clock/calendar with battery backup.

The Model 111 system unit includes 512K bytes of standard memory, a single 1.2Mb High Capacity 5.25-inch Diskette Drive, a combination Fixed-Disk and Diskette Drive Adapter, and a 20Mb Fixed-Disk Drive.

Eight option (feature) slots support feature cards for devices, features, or memory. Six of the slots support either the advanced 16-bit or the 8-bit option cards. Two support 8-bit option cards only. However, the Model 111 uses one 16-bit slot for the standard combination fixed disk and diskette drive adapter. The result is seven available expansion slots. A retainer bar is provided to secure the feature cards.

Technical Information: The System Unit contains the following major functional components:

- Advanced high-performance Intel 80286 microprocessor at 8 MHz clock speed
- 24-bit addressing
- 16-bit data path
- ROM based automatic power-on self test of system components
- BASIC language interpreter
- 64K bytes ROM
 - Access Time - 150 ns
 - Cycle Time - 355 ns
- 8086 compatible real address mode
- Limited protected virtual address mode functions
- 512K bytes of dynamic RAM on the system board
 - Access Time - 150 ns
 - Cycle Time - 275 ns
- Combination fixed-disk and diskette drive adapter
- System clock/calendar/configuration w/CMOS RAM and battery backup
- Directionally-mounted speaker
- Diskette area cover door with protective keylock
- Bi-directional keyboard interface
- Enhanced Keyboard
- Power-on indicator (green)
- Eight expansion slots with retainer bar to secure feature cards
 - Six slots support either the advanced 16-bit or 8-bit option cards,
 - Two slots support 8-bit option cards only.
- Seven-Channel Direct Memory Access (DMA)
- 16-level interrupt
- Three programmable timers
- Cooling fan with removable filter
- 80287 math co-processor socket
- Dimensions of 7532:
 - Depth: 513.4mm (20.2 in.)
 - Width: 436.8mm (17.2 in.)
 - Height: 221.0mm (8.7 in.)
- Weight of 7532 Model 111: 23.6 Kg (52.1 lbs.)

Specified Operating Environment:

- Electrical:
 - 192 watt switchable worldwide power supply
 - AC Operating Voltages:
 - ▲ 100-125V, 50-60 Hz

- ▲ 200-240V, 50-60 Hz
 - Power line lightning surges of +/- 2500 volts
- Air Temperature:
 - System on: 0 to 50 C (32 to 122 F)
 - System off: 0 to 55 C (32 to 131 F)
 - Shipment (packaged): -40 to 60 C (-40 to 140 F) Note: The machine must be dry and fully acclimated to operating temperature prior to power on.
- Operational Altitude: Up to 2,135m (7,000 ft.)
- Relative Humidity:
 - System on or off: 8% to 85% non-condensing
 - Shipment (packaged): 5% to 100%
- FCC Class A
- Particulates Contaminants Filtering:
 - Suspended particulates: 500 micrograms per cubic meter
 - Benzene soluble organics: 30 micrograms per cubic meter
 - Settleable particulates: 1500 micrograms per square centimeter for 30 days
- Shock: 0.5G at 10 millisecond duration (1/2 sine wave)
- Vibration:
 - 5 to 10 Hz at 0.030 inches double amplitude displacement
 - 10 to 200 Hz at 0.15G peak
 - 200 to 500 Hz at 0.077G peak
- BTU Output: 1229 BTU/Hr

Publications: The following publications will be included with each system unit shipped:

- IBM 7532 Industrial Computer Operator's Guide
- IBM 7532 Installation and Setup

Additional publications available for purchase are:

- Technical Reference System Unit (#6256): The Technical Reference System Unit is for programmers, engineers and others who want to understand the 7532 Industrial Computer in greater detail. This reference manual includes functional specifications, BIOS listings, hardware specifications, and printouts for peripheral connectors.
- Technical Reference Options and Adapters (#6035): The Technical Reference Options and Adapters manual includes functional specifications for programmers, engineers and others who want to understand 7532 Industrial Computer options and adapters in greater detail.
- Maintenance Information Manual (#6255): The Maintenance Information Manual is for service personnel and details many aspects of maintaining the machine. They include instructions for identifying the failure of a field replaceable unit (FRU), a parts catalog, and a copy of the Advanced Diagnostic Diskette.
- BASIC Reference Manual Version 3 (#0075).

SPECIAL FEATURES

Enhanced Display Station Emulation Adapter (#2911): This option provides for direct attachment of the IBM Industrial Computer to the IBM System/34, IBM System/36 and IBM System/38, using the IBM Enhanced 5250 Emulation Program Version 2.12. It can attach remotely via the 5251 Model 12. The IBM Industrial Computer will emulate the 5250 work station family displays and printers. The IBM Industrial Computer can also be attached to the System/36 or System/38 remotely via the IBM 5294 Remote Control Unit.

The Enhanced Display Station Emulation Adapter is a printed circuit card that is installed in one of the 7532 expansion slots. Also available are the integrated attachment cable for connecting the adapter to the twinax line (line termination resistors are part of the cable assembly), an Installation and Problem Determination Procedures Manual, and a 5.25-inch diskette containing diagnostic programs.

The design of the circuit card allows the IBM Industrial Computer to establish one or two sessions with the System/34, System/36 and System/38. Host device address(es) are set under program control.

The Enhanced 5250 Emulation Installation Convenience Kit (#2910) includes all parts, software and manuals required to install the Enhanced Display Station Emulation Adapter and Enhanced 5250 Emulation Program Version 2.12 in the IBM Industrial Computer.

For further information see IBM Announcement dated February 3, 1987.

128/640K Bytes Memory Expansion Option (#3338): This Memory Expansion Option comes with 128K bytes of memory. With the addition of the 512K bytes Memory Module Kit (#3339), this option can be expanded to 640K bytes.

When the Memory Expansion Option is installed fully populated (640K bytes), the user will have available 640K bytes of memory in the real address space and 512K bytes of memory in the protected address space.

For further information see IBM Announcement dated April 2, 1986.

512K Bytes Memory Module Kit (#3339): The Memory Expansion Module Kit option provides an additional 512K bytes memory on either the 128/640K bytes Memory Expansion Option (#3338) or the 512K bytes/2Mb Memory Expansion Option (#3343).

For further information see IBM Announcement dated April 2, 1986.

512Kb/2Mb Memory Expansion Option (#3343): This Memory Expansion Option comes with 512K bytes of memory. With additional 512K bytes Memory Module Kits (#3339), this option can be expanded to a maximum of 2Mb (the base option plus three Memory Module Kits).

A maximum of five 512Kb/2Mb Memory Expansion Options can be installed in a system unit providing 10Mb of additional memory.

For further information see IBM Announcement dated April 2, 1986.

IBM Token-Ring Network PC Adapter Cable (#3390): The IBM Token-Ring Network PC Adapter Cable is a 2.4m (8 ft.) attachment cable used to connect the #3391 or #5063 adapter to the network cabling system.

For further information see IBM Announcement dated April 16, 1986.

IBM Token-Ring Network PC Adapter (#3391): The IBM Token-Ring Network PC Adapter is a feature card for the attachment of the 7532 Industrial Computer to the IBM Token-Ring Network.

The IBM Token-Ring Network is a high-speed communications network for interconnecting information processing equipment at a local site. The network uses the IBM Cabling System, including Type 3 specified telephone media, for physical interconnection, and a token-ring access protocol for network traffic control. The IBM Token-Ring Network is a baseband token-ring local area network that conforms to the IEEE 802.5 and IEEE 802.2 standards and the ECMA 89 standards.

The IBM Token-Ring Network PC Adapter is a feature card which contains a microprocessor operating under control of adapter resident microcode. The adapter transmits and receives at a speed of 4 million bps using protocols conforming with IEEE 802.5 and ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard.

For further information see IBM Announcement dated October 15, 1985.

IBM 1Mb To 6Mb Memory Expansion Adapter (#3400): This multi-function adapter provides up to 6Mb of memory, split memory addressing, a parallel printer port and an asynchronous serial communications port. The adapter comes with 1Mb of memory installed. Memory Module Kits can be added in increments of 1Mb up to a maximum of 6Mb per adapter. A maximum of three adapters may be installed, providing 16Mb of additional memory. The split memory addressing feature allows the base memory to be filled to the 640Kb limit with the remaining adapter memory automatically becoming part of the expansion memory area.

The asynchronous serial communications port is a 9-pin D-shell RS-232-C connector for interfacing to a modem, remote display terminal, a serial printer or other serial device. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel printer port provides a 25-pin connector to connect a parallel printer.

One 16-bit expansion slot is required for each adapter. Adapters are customer installable. A maximum of two serial and two parallel ports are supported by the 7532 Industrial Computer.

For further information see IBM Announcement dated December 2, 1986.

1Mb Memory Module Kit (#3402): Expands the memory capacity of the Memory Expansion Adapter (#3400) in increments of 1Mb up to a maximum of 6Mb per adapter. Each kit consists of two 512Kb memory modules inserted into memory module sockets on the adapter card. A maximum of five kits can be added to each adapter card. Memory Module Kits are customer installable.

For further information see IBM Announcement dated December 2, 1986.

Advanced 3278/79 Emulation Adapter (#5050): The Advanced 3278/79 Emulation Adapter is a circuit card that plugs into any one of the expansion slots in the IBM Industrial Computer System Unit. A cable receptacle mounted on the card provides for attachment of a customer-supplied coaxial cable, IBM Cabling System media (3274 attachment only), or telephone twisted-pair via IBM/ROLM Coax-to-Twisted-Pair Adapter at the rear of the system unit. Most, but not all, functions of the emulated displays are supported.

The Advanced 3278/79 Emulation Adapter provides host communications support via 3278/79 emulation. When used with the IBM PC 3270 Emulation Program Entry Level or IBM equivalent, the Industrial Computer can emulate the functions of a 3278 Display Station Model 2 or a 3279 Color Display Station Model 2A or S2A with certain restrictions and can support file transfer with certain host systems. Both the host-controlled 3270 session and a local IBM Disk Operating System (DOS) session can be active concurrently and the user can interact with either session alternatively.

The 3270-PC File Transfer Program (5664-281 for Virtual Machine/System Product (VM/SP), 5665-311 VSE/SP 2.1.1, 2.1.2, or SSX/VSE 1.4.1, or IBM equivalent) is required for file transfer.

File transfer to the 4700 system is not supported.

The following are additional highlights of the Advanced 3278/79 Emulation Adapter:

- Distributed function terminal mode operation - Allows distribution of 3270 data stream processing from the control unit to the Industrial Computer and allows implementation of advanced capabilities such as multiple concurrent 3270 sessions. Requires corresponding capability in the upstream node (available with the 3274 Control Unit) and in an IBM Personal Computer 3270 Emulation program (available with 3270-PC Control Program). Additional information is available in the IBM Personal Computer 3278/79 Emulation Adapter Technical Reference for the Advanced Adapter.

- Low power usage

- Attachment of the IBM Industrial Computer to:

- IBM 3274 Control Unit
- IBM 4321 Processor Display/Printer Adapter
- IBM 4331 Processor Display/Printer Adapter
- IBM 4361 Processor Display/Printer Adapter
- IBM 4701 Finance Communication Controller

- No host hardware or host system software modifications required for 3270 emulated functions.

- Supports attachment to the 3274 via the 3299 Terminal Multiplexer.

For further information see IBM Announcement dated March 18, 1986.

IBM Token-Ring Network PC Adapter II (#5063): The IBM Token-Ring Network PC Adapter II, when operating with the IBM Token-Ring Network Bridge program, provides bridging of IBM Token-Ring Network rings. This increases the allowable number of attaching devices that communicate on an IBM Token-Ring Network within the establishment. The bridging of multiple rings provides the appearance of one logical ring with transparency to higher level protocols.

The IBM Token-Ring Network PC Adapter II can also be used for situations which require additional RAM for increasing message segment size and/or increasing the number of link stations supported by the adapter. For example, the IBM Token-Ring Network PC Adapter II in a server may improve performance when multiple workstations require simultaneous access to the server.

For further information see IBM Announcement dated April 16, 1986.

AT/370 Option Kit (#6115): This option, along with VM/PC 1.1, allows the 7532 Industrial Computer to be a System/370 work station. A 3278/79 Emulation Adapter (#5050) may be installed with this AT/370 Option Kit in the system unit for a host 3278/79 session and data transfer.

Highlights of the AT/370 Option Kit and VM/PC 1.1 are:

- Support of unique concurrent sessions via "hot key":
 - Local System/370 CMS session
 - Host-3278/79 session via an optional 3278/79 Emulation Adapter that will provide a coaxial connection to an:
 - ▲ IBM 3274 Control Unit
 - ▲ IBM 4321/4331/4361 Processor via a Display/Printer Adapter
 - ▲ IBM 4361 Processor via a Work Station Adapter
 - ▲ IBM 4701 Finance Communication Controller via a Device Cluster Adapter (host server functions not supported)
 - Remote 3101 emulation session with IBM Personal Computer 3101 Emulation licensed program (6024042) and serial/parallel adapter installed
 - System/370 Processor Control Session
- Ability to execute many unaltered host System/370 VM/CMS programs
- Hardware relocate to support up to 8Mb virtual addressing
- 7532 Industrial Computer functional capabilities unchanged after this option kit is installed.

The AT/370 Option Kit consists of two (PC/370-P2 and PC/370-M2) cards that allow the 7532 Industrial Computer to execute many of the System/370 instructions.

The PC/370-P2 card consists of three microprocessors, a page table and attendant circuitry.

The first microprocessor executes most of the commonly used fixed point System/370 instructions. It performs all instruction fetches and decoding and all effective address calculations. The general purpose registers (GPR) and program status word (PSW) are kept in this microprocessor.

The second microprocessor emulates the remaining non-floating-point System/370 instructions, interprets the diagnose instruction, manipulates the page table, handles exceptional conditions, and performs hardware housekeeping as required.

The third microprocessor executes System/370 floating-point instructions. The floating-point registers are kept in this microprocessor.

The page table consists of two static RAM devices arranged in a 2,048 x 12 array. Each virtual page is assigned to an entry in the

page table. Each entry contains its real page number and status bits.

The PC/370-M2 card contains 512Kb of parity checked RAM accessible from either the PC/370-P2 card or the microprocessor for the 7532 Industrial Computer. Concurrent requests for memory accesses are arbitrated.

This memory (512Kb) is viewed in native mode as a 128Kb storage area that begins at the end of the 512Kb of required memory in the 7532 Industrial Computer.

The PC/370-P2 card views the 512Kb memory as two separate areas which are not contiguously addressable. The area from 0 to 480Kb is addressed from 0 to 480Kb and is real System/370 space. The area from 480Kb to 512Kb is addressed from 0 to 32Kb and is control store for the second microprocessor on the PC/370-P2 card.

The optional features that are usable in a 7532 Industrial Computer with an AT/370 Option Kit and VM/PC 1.1 are:

- IBM Advanced 3278/79 Emulation Adapter (#5050)
- 5532 Industrial Color Display via a Color/Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) for local or host 3279 Model 2A or S2A emulation sessions.
- 7534 Industrial Graphics Display via a Color/Graphics Monitor Adapter (#4910) or Enhanced Graphics Adapter (#1200) for local or host 3279 Model 2A or S2A emulation sessions.
- Memory Expansion Options (maximum three since the System/370 Processor, System/370 memory, and combination fixed disk and diskette adapter occupy three of the six 16-bit slots on the system board.
- Serial/parallel adapter
- 20Mb fixed disk drive
- High capacity diskette drive (1.2Mb)
- Double-sided diskette drive (360Kb)

Other optional features such as the following are not explicitly supported by the AT/370 Option Kit with VM/PC 1.1 but are supported in stand-alone (native) mode.

- Math Co-processor (#0211)
- PC Network Adapter (#0213)
- Prototype Adapter (#0220)
- Binary Synchronous Communications Adapter (#1204)
- Synchronous Data Link Control Communications Adapter (#1205)
- Cluster Adapter (#1206)
- Data Acquisition and Control Adapter (#1502)
- General Purpose Interface Bus Adapter (#1503)
- Enhanced Display Station Emulation Adapter (#2911)

For further information see IBM Announcement dated October 25, 1984.

3.5 Inch 720KB Diskette Drive (#6163): This feature is a half-high, double-sided 3.5 inch diskette drive supporting the 3.5 inch media with 720K bytes storage capacity.

The option provides data transfer between 5.25-inch and 3.5-inch media, allowing greater compatibility with other IBM equipment.

The drive uses the combination fixed-disk and diskette drive adapter, standard on the 7531 and 7532. The drive requires the IBM Disk Operating System (DOS) Version 3.2 or higher, and must be installed as drive B of the system unit.

With unlike diskette drives installed, special considerations are necessary if a backup copy or working copy of 5.25-inch diskettes are required. The backup or working copy will be on a 3.5-inch diskette that cannot be used in the 5.25-inch diskette drive A.

Supported Features: The new Model 111 supports most features and peripheral devices of the current 7532 Industrial Computer Model 041. These features and peripheral devices include:

Special Feature

80287 Math Co-processor	#0211
Serial/Parallel Adapter	#0215
Serial Adapter Cable	#0217
Prototype Adapter	#0220
Serial Adapter Connector	#0242
PC Network, Adapter	#0213
Base Expander	#0230
Distance Kit	
Short	#0231
Medium	#0232
Long	#0233
Cabling Segments	
25-foot	#0234
50-foot	#0235
100-foot	#0236
200-foot	#0237
Enhanced Graphics Adapter	#1200
Graphics Memory Expansion Card	#1201
Graphics Memory Module	#1203
BSC Adapter	#1204
SDLC Adapter	#1205
PC Cluster Adapter	#1206
PC Cluster Cable Kit	#1207
DAC Adapter	#1502
Distribution Panel	#1504
GPIO Adapter	#1503
Communications Adapter Cable	#2067
Enhanced 5250 Emulation Installation	
Convenience Kit	#2910
Display Station Emulation Adapter	#2911
Integrated Attachment Cable	#2877
Memory Expansion	
128/640Kb Memory Expansion Option	#3338
512Kb/2Mb Memory Expansion Option	#3343
512Kb Memory Module Kit	#3339
1Mb to 6Mb Memory Expansion Adapter	#3400
1Mb Memory Module Kit	#3402
Color/Graphics Monitor Adapter	#4910
Advanced 3278/79 Emulation Adapter	#5050
Combination Adapter Cable	#6001
20Mb Fixed Disk Drive	#6250
Diskette Drive	
5.25-inch 1.2Mb	#6038
5.25-inch 360Kb	#6039
3.50-inch 720Kb	#6163
Realtime Interface Co-Processor	
with 128Kb in 5.25-inch media	#6050
with 128Kb in 3.5-inch media	#6165
with 512Kb in 5.25-inch media	#6160
with 512Kb in 3.5-inch media	#6166
512Kb Memory Expansion Option	#6161
EIA RS-232-C/CCITT V.24 Board	#6051
CCITT V.35 Board	#6053
128Kb Memory Expansion Option	#6055
EIA RS-232-C Direct Attach Cable	#6056
EIA RS-232-C Modem Attach Cable	#6057
CCITT V.35 Cable	#6061
EIA RS-422-A Board	#6064
20-mA Current Loop Board	#6066
Realtime Interface Co-Processor	

MACHINES

Multiport	
4 Ports, with 128Kb in	
5.25-inch media	#6240
4 Ports, with 128Kb in	
3.5-inch media	#6241
512Kb Memory Expansion	
Option	#6242
Multiport Four Port Addition	#6245
Multiport EIA RS-232C	
Interface Cable	#6246
Combination Adapter II	#6020
128Kb Memory Board for	
Combination Adapter II	#6040
Remote Terminal Interface	#6078
AT/370 Option Kit	#6115
IBM Token-Ring Network	
PC Adapter	#3391
IBM Token-Ring Network	
PC Adapter II	#5063
IBM Token-Ring Network	

| PC Adapter Cable

#3390

| Additional peripheral devices supported are:

- | ● IBM 5532 Industrial Color Display
- | ● IBM 7534 Industrial Graphics Display
- | ● IBM 5178 PC Network Translator Unit

MODEL CONVERSIONS (NONE)

ACCESSORIES

- | ● Rack Mounting Slides (#6023)
- | ● Keyboard Mounting Kit (#6024)

SUPPLIES (NONE) <

7534 INDUSTRIAL GRAPHICS DISPLAY**PURPOSE**

The 7534 is designed for applications in industrial plant floor environments, where a display that is resistant to harsh physical conditions is required. When used with the IBM Enhanced Graphics Adapter (#1200), the 7534 provides an improved color graphics level for the IBM Industrial Computer to which it is attached.

MODEL**Model 1 001**

Prerequisites: An IBM Industrial Computer system is required.

The 7534 requires that the IBM Enhanced Graphics Adapter (#1200) or IBM Color/Graphics Monitor Adapter (#4910) be installed in the IBM Industrial Computer to which it is attached. A signal cable connects to either adapter.

Customer Setup (CSU): The 7534 and its options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each machine and option. Setup service is available from the IBM National Service Division at IBM hourly rates and minimums, or by a Contract Support Service (CSS) Agreement.

HIGHLIGHTS

- Direct-drive color display
- Operates with the IBM Enhanced Graphics Adapter (#1200) or with the IBM Color/Graphics Monitor Adapter (#4910)
- 330mm (13 in.) (diagonal) monitor
- Cooling fan with replaceable filter
- Provides 640 x 350 picture element (PEL) definition in up to 64 colors for graphics (16 colors at one time when operating with the IBM Enhanced Graphics Adapter, lower limits when operating with the IBM Color/Graphics Monitor Adapter)
- Displays high quality (8 x 14 character box) text in color
- Includes a dual frequency design that permits 22KHz for enhanced operation (640 x 350) and 15.75KHz for compatibility modes (640 x 200 and 320 x 200)
- Provides brightness and contrast control located on the side of the display
- Has a protective clear screen cover

DESCRIPTION

The 7534, when used with the IBM Enhanced Graphics Adapter (#1200), is designed to provide improved color graphics in the plant floor environment for IBM Industrial Computer users. The 7534 provides 640 x 350 PEL definition from a palette of 64 colors. Sixteen colors may be used at one time when operating with the IBM Enhanced Graphics Adapter (#1200).

The compatibility modes allow the 7534 to operate with either the IBM Enhanced Graphics Adapter or the IBM Color/Graphics Monitor Adapter.

The 7534 is similar in size and shape to the IBM 5532 Industrial Color Display.

The 7534 is designed for desk/tabletop use. With the addition of the Display Mounting Kit (#6025), the 7534 can be installed inside a standard 19-inch rack that is 22 inches to 30 inches in depth.

TECHNICAL INFORMATION

- Horizontal scan frequency 22KHz or 15.75KHz, depending on the polarity of the vertical sync signal from the adapter.
- Vertical scan frequency 50 to 60 Hz
- 0.31mm dot pitch
- Non-interlaced operation
- Normal persistence phosphors (P22 equivalent)
- Max. wet bulb dew point 27 degrees Celsius
- Dimensions:
 - Width - 392mm (15.4 in.)
 - Depth - 407mm (15.6 in.)
 - Height - 297mm (11.7 in.)
 - Weight - Approximately 14.4Kg (29 lbs.)
- Signal cable length: 3 ft., 6 in.

SPECIFIED OPERATING ENVIRONMENT

- Electrical:
 - Operating Voltages: 90 to 137 volts AC, nominal 120 VAC, 50/60 Hz
 - Power line lighting surges of +/- 2500 volts, as outlined in FCC Docket 19528 - Part 68
- Air Temperature:
 - System on: 0 degrees to 50 degrees C (32 degrees to 120 degrees F)
 - System off: 0 degrees to 55 degrees C (32 degrees to 131 degrees F)
- Relative Humidity: 8 percent to 80 percent, non-condensing
- FCC Class A
- Particulates Contaminants Filtering:
 - Suspended particulates: 500 micrograms per cubic meter
 - Benzene soluble organics: 30 micrograms per cubic meter
 - Settleable particulates: 1500 micrograms per square centimeter for 30 days
- Shock: 0.5G at 10 millisecond duration
- Vibration:
 - 5 to 17 Hz at 0.005 inches double amplitude displacement
 - 17 to 200 Hz at 0.07G peak
 - 200 to 500 Hz at 0.036G peak
- BTU Output: 300 BTU/Hr

Publications: "IBM Industrial Color Monitor Installation and Operation Guide" (#6034)

Technical Assistance: Customers who have signed an IBM Industrial Computer Volume Procurement Amendment (VPA) and have ordered twenty or more 7534s may designate from one to three technical coordinators who may contact the Personal Computing Assistance Center (PCAC) for usage assistance. The usage assistance is available for the contract period.

MACHINES

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MAJOR REVISION

Customer technical coordinators may participate in an education program administered by the PCAC. The education may be self-study or conducted in a classroom at a PCAC-selected location.

SPECIFY

No specify required.

SPECIAL FEATURES

Display Mounting Kit (#6025): Used to mount the 7534 in a standard 19 inch rack that is 22 inches to 30 inches in depth.

Shaded Screen Cover (#6026): Allows the user to replace the clear screen cover, standard on the 7534, with a shaded screen cover. Customer Setup: Yes.

Optically Coated Glass Cover (#6027): Allows the user to replace the clear screen cover, standard on the 7534, with an optically coated glass cover. Customer Setup: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

7552 INDUSTRIAL COMPUTER**PURPOSE**

The IBM 7552 Industrial Computer is designed for applications where the computer is an integral part of plant operation environment. The 7552 is designed to meet the reliability, serviceability, and environmental requirements of the industrial market. The 7552 can be installed in industrial panels (e.g., NEMA enclosures) without requiring air conditioning. The 7552 can also be mounted in a 19-inch rack or can be floor mounted. The Remote Terminal Interface (RTI) is an adapter that is installed in an IBM Industrial Computer (5531, 7531, 7532, 7552) to provide the interface to connect the IBM Industrial Computer to the 7552.

MODELS

Model 040: Consists of processor, frame, and power supply.

Model 140: Consists of processor, frame, power supply, disk/diskette adapter and a 10Mb fixed disk.

Prerequisites: If the 7552 is configured without diskette, display, or keyboard, an IBM Industrial Computer (5531, 7531, 7532, 7552), configured with keyboard, display, and diskette, must be available to be connected to the 7552 for initial program load and diagnostics. To connect an Industrial Computer to the 7552, an RTI feature (#6078) is required. The RTI installs in the machine that is used as the terminal.

An IBM PC Card Adapter (#6077) is required to install any feature adapter, except the Memory Adapter (#6074), in the 7552.

Customer Setup (CSU): Yes, machine and features. The 7552 is designated as a customer setup unit, thereby offering the customer the option to install the machine at all desired customer locations and relocation flexibility. Aids and configurators are provided to enable the 7552 to be properly ordered and configured. Setup procedures for the customer will be shipped with each machine. A clear indication that the machine is operational will be given.

HIGHLIGHTS

The 7552 integrates the following features and functions:

- Industrial packaging (can be installed in industrial panels as well as 19-inch industrial rack and floor mounted)
- All components are pluggable in the frame including the processor cards, the power supply, and disk/diskette module
- The processor cards, the memory card, and the feature cards are enclosed in shrouds to protect components on the cards while the cards are being handled
- Extended temperature operation
- Extended vibration and shock operation
- Meets IEEE 472-1974 surge test
- Extended corrosive gasses operation
- Extended particulates operations
- High reliability
- Ease of Service (malfunction indicators and easy-to-access pluggable modules)
- Orderly shutdown in case of power failure (battery backup on entire system unit)
- Orderly start-up after a power shutdown or machine malfunction

- Display and keyboard not required for system operation
- Error detection and recovery
- Single-bit error correction and double-bit error detection on all memory (ECC)
- Digital outputs to activate external alarms in case of a machine or operation malfunction

DESCRIPTION

The two configurations for the 7552 consist of:

- **Model 040:** The frame, the power supply, and the processor including 512Kb of memory. There are seven slots available for optional features. The available slots are filled with empty card shrouds.
- **Model 140:** The frame, the power supply, the processor including 512Kb of memory, fixed disk/diskette adapter, and one 10Mb fixed disk. There are five slots available for optional features. The available slots are filled with empty card shrouds.

The 7552 is based on a high-performance, 16/24-bit, 10M Hz Intel 80286 microprocessor, and 512Kb of memory standard. The system memory may be further expanded with memory card and 512Kb memory options.

A single disk/diskette module is available on the 7552. The Disk/Diskette Module option is a pluggable module and occupies two slots in the system unit. Up to two 10Mb Fixed Disk Drives and one 720Kb High-Capacity Diskette Drive are available within the Disk/Diskette Module. The maximum configuration will result in a direct access storage capacity of up to 20.72Mb.

DOS 3.2 supports the 10Mb Fixed Disk Drives and 720Kb high-capacity Diskette Drive in the 7552 system.

The 7552 contains seven option (feature) slots that support feature adapters for devices, features, disk, diskette, or memory.

The 7552 contains two cooling fans. An optional filter package is available to extend the particulate specification of the 7552.

For systems that will be used as workstations, either a floor-standing feature (#6098) or a rack-mount feature (#6097) can be purchased. The floor-standing feature provides all necessary hardware to mount the 7552 in the floor-standing position and provision to bolt the system unit to the floor. The rack-mount feature (#6097) provides all necessary hardware to mount the keyboard in a standard 19-inch rack. The rack and/or panel-mount hardware for the system unit is a standard component of the 7552 and is shipped with the system.

Features #6097 and #6098 include a keyboard. This keyboard offers commonly used data and word processing functions along with separate typewriter and numeric keypads. Key-locations, enhancements, and mode indicators (Cap Lock, Numeric Lock, Scroll Lock) improve keyboard usability. Special symbols may be accessed with a combination of keys. Depending on the application program, from 10 to 40 special function keys may be supported.

The keyboard is attached to the 7552 via a 12-foot coiled cable, permitting a variety of workspace configurations.

An optional Display Mounting Kit (#6025) provides all necessary hardware components to mount the IBM 5532 or 7534 Industrial Graphics Displays in a standard 19-inch rack that is 22 to 30 inches in depth.

The 7552 is supported by the IBM PC DOS 3.2 operating system and later versions. The 7552 also supports four IBM PC software languages. These languages are:

1. BASIC compiler Version 2.0

2. C Version 1.0
3. Macro Assembler Version 2.0
4. Pascal Version 2.0 (only available on 5.25-inch diskette)

IBM program product 5601-052 provides extensions to these four languages, in the form of subroutine calls, to support the unique functions of the 7552 that are not a part of other IBM Industrial Computers. These functions are:

- Orderly shutdown following a power failure.
- Orderly start-up following power-on.
- Error detection and notifying the application software of the errors.
- Enabling and disabling the error notification functions.
- Displaying coded messages on the 2-character hexadecimal display of the processor.
- Setting and resetting a digital output point provided by the 7552 for activation of external alarms.
- Reading the position of the 7552 keylock switch for system security protection.

When the 7552 is configured without diskette, keyboard, or display, an IBM Industrial Computer configured with keyboard, display, and diskette is required to be used as a remote terminal to load programs and to provide an operator interface for the 7552. To connect the IBM Industrial Computer to the 7552, an RTI adapter is required. The RTI is an adapter that is installed in an IBM Industrial Computer (5531, 7531, 7532, 7552) to provide an interface to connect the IBM Industrial Computer to the 7552 through the keyboard port on the 7552. IBM program product 5601-053 provides program utilities to support the RTI functions.

Publications: The following publication is shipped with the product.

- #6089 IBM 7552 Industrial Computer Installation and Operation

Additional copies are available immediately, for a fee.

The following publications are available immediately, for a fee. To order, contact your IBM representative.

- #6086 IBM 7552 Maintenance Manual and Diagnostic Diskettes
- #6032 IBM 7531/7532 Industrial Computer Technical Reference Manual
- #6035 IBM Industrial Computer Technical Reference Options and Adapters

SPECIFY (NONE)

SPECIAL FEATURES

80287 Math Co-Processor (#6070): Adds floating-point math processing capability to the processor. This module is inserted into one of the processor cards. Maximum: One. Field Installation: Yes (only).

Battery (#6072): The battery provides power to support the system, for ten seconds, during a power failure. This will allow the user to program a backup procedure during the power failure.

The realtime clock is powered by this feature, and the battery should be a part of configuration for proper operation. Critical data, such as the date, the time, and an error log could be lost. Maximum: One. Field Installation: Yes (only).

External Voltage Module (#6073): This feature should be ordered if an external power source will be used for the system unit. Limitation: This feature is mutually exclusive with the Battery feature (#6072). Maximum: One. Field Installation: Yes (only).

0.5 to 3Mb Memory Adapter (#6074): This feature adds up to 3Mb of memory to the 7552. The first 512Kb increment of memory comes standard with this adapter and five additional 512Kb memory incre-

ments can be added. For additional memory, order Memory Expansion feature (#6075). Field Installation: Yes (only).

512Kb Memory Expansion (#6075): This feature adds 512Kb of memory to the Memory Adapter (#6074). Field Installation: Yes (only).

Card Shroud (#6076): This is a card shroud only that can be used with any processor, memory, or feature card. It provides: 1) Protection for the components on the card while the card is being handled; 2) Positive retention of the card in the frame; 3) An effective path for the air to cool the card. The 7552 is shipped with all empty slots filled with empty Card Shrouds (#6076). This feature should only be ordered if spare Card Shrouds are required. Field Installation: Yes (only).

IBM PC Card Adapter (#6077): This feature is required when an IBM PC feature adapter is to be plugged in the 7552. It provides an interposing card and other hardware to mount an IBM PC feature card in the IBM 7552 Card Shroud. Field Installation: Yes (only).

Remote Terminal Interface (RTI) (#6078): The RTI is an adapter that installs in an Industrial Computer (5531, 7531, 7532, 7552) and provides an interface to connect the Industrial Computer to the 7552 through the keyboard port on the 7552. When the 7552 is configured without diskette, keyboard, or display, an Industrial Computer configured with keyboard, display, and diskette is required to be used as a remote terminal to load programs and to provide operator interface for the 7552. IBM program product 5601-053 provides program utilities to support the RTI functions. A 12-foot cable is included with this feature to connect the Industrial Computer to the 7552.

The RTI should be ordered against the 7552. When the RTI is to be installed in an 5531, 7531, or 7532, the RTI should still be ordered against 7552 and with one of the following specify codes to indicate the Industrial Computer in which it will be installed:

- #6221 for IBM 5531 Industrial Computer
- #6222 for IBM 7531 or 7532 Industrial Computer
- #6223 for IBM 7552

Field Installation: Yes (only).

Disk/Diskette Adapter Module (#6080): This module allows disk and/or diskette capability on 7552 Model 040. Included in this module are the Fixed Disk/Diskette adapter card and the Fixed Disk/Diskette shroud. Up to two Fixed Disks (#6082) and one diskette drive (#6081) can be installed in the Disk/Diskette Module. The Disk/Diskette Module is a standard feature of the 7552 Model 140. Maximum: One. Field Installation: Yes (only).

Diskette Drive (#6081): This feature allows one 720Kb diskette drive to be added to the 7552. Prerequisite: On the 7552 Model 040, feature #6080 is required. Maximum: One. Field Installation: Yes (only).

10Mb Fixed Disk Drive (#6082): This feature adds one 10Mb Fixed Disk Drive to the 7552. Prerequisite: On the 7552 Model 040, feature #6080 is required. Maximum: Two with Model 040 and one with Model 140. Field Installation: Yes (only).

Prototype Card (#6094): This feature allows the customers to build prototypes of their own adapter cards for the 7552. Field Installation: Yes (only).

Memory Adapter and Card Shroud (#6095): This feature is a combination of a Memory Adapter (#6074) and a Card Shroud (#6076). The Memory Adapter is installed in the Shroud and a label on the front of the Shroud identifies the card inside to be the Memory Adapter.

Filters (#6096): Provides air filtering for the 7552 system unit to extend the particulate specification for environments requiring additional protection. Field Installation: Yes (only).

Keyboard Rack Mount Hardware (#6097): This feature includes a keyboard and the hardware to mount the keyboard in a standard 19-inch rack. Field Installation: Yes (only).

Floor Mount Kit (#6098): Provides hardware to mount the 7552 in the floor-mount position with provision to bolt the system unit to the floor. This feature includes a keyboard. Field Installation: Yes (only).

IBM Realtime Interface Co-Processor Multiport (#6240, #6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512KB of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 5.25 inch media (#6240, P/N 00F5525)
- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Limitations: Other IBM Computers, Industrial Computers, Personal Computers, options, adapters, or devices not specifically listed under "Compatibility" are not supported.

The Co-Processor, under control of the realtime control microcode, permits offloading function from the PC DOS with tasks written to the realtime control microcode interface.

Realtime Interface Co-Processor Multiport adapters can be installed as follows:

- One per system - 8530
- Up to 3 per system - 5162, 5170, 7531 and 7532
- Up to 4 per system - 7552

For complex requirements that exceed these guidelines, contact your IBM marketing representative for configuration assistance.

The architecture of the 7531, 7532, 7552 based IBM Industrial Computer and the 5162, 5170 IBM Personal Computers prohibits an eight (8) bit adapter (e.g. IBM Enhanced Graphics Adapter, PC Network Adapter, etc) to be co-resident with a sixteen (16) bit adapter (Realtime Interface Co-Processor) within the same 128KB memory region. Refer to "IBM Realtime Interface Co-Processor Technical Reference for complete details.

Hardware Requirements: The Realtime Interface Co-Processor Multiport must be installed in one of the following systems:

- 7531 Industrial Computer
- 7532 Industrial Computer
- 7552 Industrial Computer
- 5162 Personal Computer XT/286
- 5170 Personal Computer AT
- 8530 Personal System/2

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the

Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): The Realtime Interface Co-Processor Multiport and all options are customer setup (CSU). CSU allowance is one day. Detailed setup instructions are included with each Co-Processor card.

Highlights:

- Advanced high-performance Intel(1) 80186 microprocessor
- 128KB or 512KB of dual-ported memory with parity for error detection
- 8-bit mode and 16-bit mode data bus support
- Two-channel direct memory access for use between the Co-Processor storage and the first two ports
- Eight selectable interrupt levels
- Zilog(2) 8030 Serial Communications Controller
- Four or eight EIA RS-232-C/CCITT V.24 serial I/O ports
- Supports 19.2K bps full duplex ASYNC protocols and 38.4K bps full duplex HDLC/SDLC protocols. All 8 ports may be run concurrently at up to 9.6K bps.
- Half-Duplex and Full-Duplex operation
- Asynchronous, bit synchronous, and character synchronous protocol hardware support on 2 ports. Asynchronous hardware support on the remaining 2 or 6 ports
- CRC generation and checking
- Eight programmable hardware timers
- Watchdog timer
- Watchdog timer status indicator
- IBM Realtime Interface Co-Processor Guide to Operations
 - Hardware setup
 - Software setup
 - Problem Determination Procedures
 - Customer diagnostics diskette.
- Realtime Control Microcode
 - Multitasking, preemptive priority
 - Co-Processor memory management
 - Timer support
 - Watchdog timer support
 - Queue management
 - Inter-task communications
 - Initial Program Load.
- ROM-based automatic power-on self-test of Co-Processor components
- ROM-based I/O utility routines
- ROM-based bootstrap loader

(2) Registered trademark of Zilog Incorporated

Operating Environment:

Electrical - FCC Class A: Installation of the Realtime Interface Co-Processor Multiport changes the FCC rating of the 5170 system unit to FCC Class A. The Realtime Interface Co-Processor is shipped with a FCC Class A label attached. Refer to "IBM Realtime Interface Co-Processor Multiport Guide To Operations" for the FCC Statement.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations: The manual provides an introduction to the product and also includes instructions for setup, problem determination procedures, option setup, relocation of the Co-Processor and cable. This publication is intended for anyone who will be installing, using, or programming the Co-Processor on the IBM Industrial Computer or the IBM Personal Computer.

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- IBM Realtime Interface Co-Processor Technical Reference (SC28-8006): The technical reference describes the hardware design and interface information. This publication has information covering the ROM-resident microcode. Detailed information on the programmer interfaces to the realtime control microcode is included. The information in this publication is for reference use and is intended for hardware and software designers who need to understand the design and operational characteristics of the Co-Processor, Realtime Control Program microcode, and cable.
- IBM Realtime Interface Co-Processor Hardware Maintenance and Service (SC28-8005): The Hardware Maintenance and Service manual is used to isolate and repair any failure of the Co-Processor. This manual contains a "Problem Isolation" section with step-by-step instructions for identifying a failure. In addition, a "Removal/Replacement" section provides all the necessary information to complete the repair (that is, adjustment, replacement, and so on) after the failing Co-Processor has been identified. This manual is intended for anyone who will be diagnosing and maintaining the IBM Industrial Computer or IBM Personal Computer. Included with this manual is the Advanced Diagnostics diskette and wrap-connectors for use when running Co-Processor diagnostics.
- IBM Disk Operating System Technical Reference Version 3.3 (P/N 6280059)

Description: The Realtime Interface Co-Processor Multiport has been designed for use in the IBM Personal Computers and IBM Industrial Computers. The Co-Processor is compatible with the 7531, 7532, 7552, 5162, 5170, and 8530 computer systems.

The Co-Processor can be connected to a wide variety of communication, terminal, or industrial devices as well as systems. It provides the capability of off-loading applications and device drivers from the Personal or Industrial Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel 80186 microprocessor. Provided as a standard feature are four (eight with the optional feature) independent serial ports that operate at speeds up to 38,400 bps using direct memory access. One port can operate at 38,400 bps full duplex, while a second is operated at a maximum of 19,200 bps full duplex. All four or eight ports may be operated concurrently at 9.6Kb per second full duplex. The first two ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode, whereas the remaining ports are asynchronous using interrupt mode.

The Co-Processor's memory is dual-ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable. The Co-Processor can operate in 8-bit or 16-bit mode on the 7531, 7532, 7552, 5162, 5170 and 8530.

The Realtime Interface Co-Processor Multiport will be available with either 128KB or 512KB of memory, four or eight ports, and will be shipped with either 5.25 inch or 3.5 inch program media.

The realtime control microcode for the Realtime Interface Co-processor Multiport is included with the Co-processor feature shipped on a 5.25 inch or 3.5 inch dual-sided double density diskette.

The realtime control microcode (RCM) provides a realtime, multi-tasking operational environment for supporting user applications running on the Co-Processor. The RCM is loaded from the system unit memory to the Co-Processor memory. Once loaded, the RCM initializes itself and the Co-Processor. It then signals the system unit processor that it is loaded and ready.

The RCM supports up to 253 concurrent tasks running on the Co-Processor. Tasks are loaded from the system unit memory. A task running under the RCM may communicate with another task running under the same control program or with an application program running in the system unit.

The IBM PC Macro Assembler can be used as the program-preparation facility for generating the application tasks residing in the Co-Processor memory.

The realtime control microcode supports dynamic memory management. Storage is allocated in multiples of 16-byte paragraphs upon request of a task. Timer support is also provided. There may be up to 255 software timers with increments ranging from 5 milliseconds to 327 seconds.

The dispatch queue functions as a priority queue with round-robin dispatching on any priority level. The possible priority levels range from 1 to 255; 1, being the highest priority.

Task synchronization is accomplished by a wait/post or suspend/resume mechanism.

The watchdog timer support is used to signal an error condition should the Co-Processor fail. It will interrupt both the system unit processor and the Co-Processor upon failure and switch on an error indicator on the Co-Processor card.

Detailed information on the operational characteristics of the realtime control microcode is provided in the optional "Realtime Interface Co-Processor Technical Reference" (#6058, P/N 67X1234).

Optional Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512KB Memory Expansion (#6242, P/N 00F5529): Replaces the 128KB of Co-Processor memory with 512KB of memory. This feature upgrades the Co-Processor, #6240 or #6241, to the maximum memory capacity of 512KB.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

- Hardware technical information
- Realtime control microcode description
- Interface Board design information.

Realtime Interface Co-Processor Hardware Maintenance and Service (#6059, P/N 67X1206)

- Problem Determination Procedures
- Advanced Diagnostics Diskette
- Wrap Connector

Additional Features: The following features are also supported on the 7552:

- PC Network Adapter (#0213)
- PC Network Cabling Components:
 - Base Expander (#0230)
 - Distance Kit:
 - ▲ Short (#0231)
 - ▲ Medium (#0232)
 - ▲ Long (#0233)
 - Cabling Segments:
 - ▲ 25-Foot (#0234)
 - ▲ 50-Foot (#0235)
 - ▲ 100-Foot (#0236)
 - ▲ 200-Foot (#0237)
- Serial/Parallel Adapter (#0215)
- Serial Adapter Cable (#0217)
- Serial Adapter Connector (#0242)
- Enhanced Graphics Adapter (#1200)
- Graphics Memory Expansion Card (#1201)
- Graphics Memory Module Kit (#1203)
- Binary Synchronous Communications Adapter (#1204)
- SDLC Communications Adapter (#1205)
- Data Acquisition and Control Adapter (#1502)
- Distribution Panel (#1504)

MACHINES

- General Purpose Interface Bus Adapter (#1503)
- Communications Adapter Cable (#2067)

For description of the above features, refer to the IBM 7532 Industrial Computer announcement letter.

For description of the following features, refer to the IBM Realtime Interface Co-Processor announcement letter:

- IBM Realtime Interface Co-Processor (128Kb) with control program (on 5.25-inch diskette) (#6050)
- IBM Realtime Interface Co-Processor (512Kb) with control program (on 5.25-inch diskette) (#6160)
- IBM Realtime Co-Processor Interface Boards:
 - RS-232 (#6051)
 - V.35 (#6053)
 - RS-422 (#6064)
 - 20ma Current Loop (#6066)
- IBM Realtime Interface Co-Processor Memory Expansion:
 - 128Kb (#6055)
 - 512Kb (#6161)
- IBM Realtime Interface Co-Processor Cables:
 - RS-232-C Direct Attach (#6056)

- RS-232-C Modem Attach (#6057)
- CCITT V.35 Interface (#6061)

The following optional special features are supported. For descriptions of the features, see IBM Product Announcements dated October 15, 1985, and April 16, 1986.

- IBM Token-Ring Network PC Adapter (#3391)*
- IBM Token-Ring Network PC Adapter II (#5063)*
- PC Adapter Cable (#3390)

*An IBM Personal Computer Feature Adapter (#6077) is required for each of these adapters.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

8101 STORAGE AND I/O UNIT MDLS A10 - A13

(NO LONGER AVAILABLE)

THERE IS MORE THAN 1 TEXT VERSION OF THIS PRODUCT

PURPOSE

Provides additional disk storage and device attachment capability for the 8100 Information System.

MODELS A10, A11, A13

Model A10: Device attachment capability.

Model A11: 29MB (29,327,360 bytes) - movable heads only and device attachments.

Model A13: 64MB (64,520,192 bytes) - movable heads only and device attachments.

Maximum: Two per 8100 Information System with an 8130 model A processor, three with an 8130 model B processor, four with 8140 processors, and eight with 8150 processors. The maximums are reduced by one if an 8809 Magnetic Tape Unit model 1B is attached to the processor and by one for each 8102 attached to the processor. See Table 2 for system maximums.

Prerequisites: 8130, 8140 or 8150 Processor for the mdls A10, A11 or A13. The 8101 mdl A10 requires one Display and Printer Attachment Type I (#9941) or Communication Attachment Type I (#9943).

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8101 Storage and Input/Output Unit provides additional disk storage and device attachment capabilities for the 8100 Information System. The 8101 Storage and Input/Output Unit attaches to the I/O bus of the 8130, 8140 or 8150 Processor.

Disk storage for the 8101 Storage and I/O Unit mdls A11 and A13 is provided by a non-removable high speed direct access storage. Depending on the mdl selected, disk storage of up to 64 million bytes with movable heads is available. The disk storage operates at a data rate of 1,031,000 bytes per second. The average access time is 27 milliseconds with a average rotational delay of 9.6 milliseconds. Removable diskette storage of up to 1MB (985,088 bytes) is available and operates at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370 or 4341 processor via the 3704, 3705, 3720 or 3725 for SNA/SDLC or BSC line control. The 8100 System can attach to the ICA of the 115, 125, 135, or 138 Processors for BSC line control. The 8100 System can attach to the Communications Adapter of the 4331 Processor for BSC and/or SDLC line control. For specific attachment, see M2700 pages.

The 8101 Storage and I/O Unit extends the capability of the 8100 Information System by providing for the attachment of a variety of input/output devices. These devices consist of Displays, Printers, Magnetic Tape, Controllers and Data Collection Units. The devices may be attached to the 8101 loops, data link attached loops, communication ports or direct attachment to the 8101.

Designated Customer Setup: The 8101 Storage and I/O Unit is designated as a customer setup unit thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to enable the 8101 to be properly ordered and config-

ured. Setup procedures for the customer will be shipped with each machine. An 8101 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuser Communications Loop Planning and Installation Guide", GA27-3341, and "Installation Guide", GA23-0039, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An updated "8100 Information System Maintenance Manual", SY27-2521 should be requested by the 8100 servicing organization.

Configuration Considerations: Care must be exercised to ensure the following when ordering, installing or relocating an 8101 or 8102:

1. The address of an 8101/8102 is determined by the System Attachment specify code when the unit is ordered. There must be no 8101/8102s with duplicate System Attachment codes within the same 8100 system.
2. An 8101 with BSC communications (#1603 or #1604) cannot be attached to an 8100 system which has an attached 8102 with a Display and Printer attachment (#3220).
3. An 8101 with System Attachment code #9924 and Communications Attachment Type 1 (#1503 or #9943) and without Display and Printer Attachment (#1502) cannot be attached to an 8100 system that has an attaching 8102 with Display and Printer attachment #3220 and specify code #9936.
4. An 8101 with System Attachment (#9923 or #9924) and Communication Attachment Type 1 (#1503 or #9943) and without Display and Printer Attachment (#1502) cannot be attached to a system which has an attaching 8102 with Display and Printer Attachment (#3320) and specify code #9937.
5. An 8101 with processor code #9931 or #9932 cannot be attached to an 8150 processor without an MES to change the processor attachment code to #9933.

Selected Configuration: To ease the selection, configuring, ordering and installation of 8101 Storage and Input/Output Units several selected configurations have been developed. These selected configurations are designed to be applicable for the majority of customer installations, both DPPX and DPCX are supported. The use of selected configurations is recommended. Traditional configuration selection and ordering should be used for configurations not included in the selected configurations.

Publications: GC20-8100.

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

- (Canada only) > Voltage (120V AC, 1-phase, 3-wire, 60 Hz): Specify #9891 for non-locking plug or #9890 for locking plug. If 4.3m (14 ft) is not desired, specify #9986 for 1.8m (6 ft) cable.<)
- (Except Canada) > Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823

MACHINES

230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803
	240V #2831<)

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

(Japan only> Specify #9890 for locking plug or #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated.<)

(Except Canada and Japan> Note: The 3-digit Country Code on the DP Machine Order Sheet will be used to select a power plug which matches the most commonly used power supply in the country.<)

- Color: Pebble gray is the only color available.
- Machine Nomenclature:

Brazilian (Portuguese)	#2933
Canadian (French)	#2935
English US	#2924
Spanish Speaking	#2931

- Relocation: If the user relocates and/or interchanges an attaching 8101 from one 8100 system to another, the user must consider address compatibility of the processor and its attachments. For further information see "IBM 8100 Information System Site Planning Guide", GA27-2884. For relocation/replace kit ordering see Relocate/Replace, in the M8130, 8140 or 8150 Accessories section.
- Cabling: For loop cabling information see the M8130, 8140 or 8150 Accessories section and the "IBM Multiuse Communication Loop-Planning and Installation Guide", GA27-3341. For communication cable information see "IBM Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.
- Processor Attachment: Specify #9931 for 8130, #9932 for 8140 or #9933 for 8150. #9939 is required for 8150 if attaching 8101 in the range of #9925 thru #9928. Field Installation: Yes.
- System Attachment: Each 8101 requires a specify code to identify one of eight sets of I/O addresses. Specify one of the following codes for each 8101 attaching to the same processor: #9921, #9922, #9923, #9924, #9925, #9926, #9927 or #9928. These specify codes may be selected in any sequence. Duplicate codes are not permitted within a system. See "Extended Storage and I/O Unit Restrictions" in M8150 pages for additional limitations. Field Installation: Yes.
- Device or Communication Attachment: Must specify one only for the 8101 mdl A10. The 8101 mdl A10 provides as part of the basic machine, the capabilities to attach Display/Printer or Communication facilities. On initial orders for the 8101 mdl A10, one of these capabilities must be specified. Further expansion of the 8101 mdl A10 is provided by special features. These same capabilities are provided by special features for the 8101 mdl A11 or A13. See Table 1 for additional configuration information.

Display and Printer Attachment Type I (#9941): Provides, in conjunction with features #1505 and #1506, the capability for the attachment of 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to a maximum of 24. Field Installation: Yes.

Communication Attachment Type I (#9943): Provides the capability for the attachment of loops and communication facilities in any combination up to a maximum of four. Additional special features for line control, com-

munication interface and modems are required to complete each communication port selected (See "System Attachment"). Field Installation: Yes.

- Terminal Requirements: For attachment of 3640 family of terminals, see "Terminal Requirements" in M8130, M8140, M8150.

SPECIAL FEATURES

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, the communication facility, the operating system installed and the application work load. The maximum number of communications features which can be physically installed can exceed the operational capability. Increased processor utilization will result from sustained operation of BSC (#1603 and #1604) at the maximum aggregate data rate and may cause degradation of activity operating at lower priority levels. Analysis should be performed to determine the impact.

Note: Use of BSC 8101-A2X feature #1605 or 8140-C features #1622, #1623, or 8150 features #1763 or #1764 instead of features #1603 or #1604 will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System Publications are dependent on the presence of functional support modules provided by Distributed Processing Programming Executive (DPPX), Distributed Processing Control Executive (DPCX). Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the Functional Definition Manual 8100 which will be available from Mechanicsburg at FCS.

Display And Printer Attachment Type I (#1501): Provides in conjunction with feature #1505 and #1506 the capability for the attachment of 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to a maximum of 24. Limitations: Not available with 8101 mdl A10. Not available with Communication Attachment Type I (#1503). Communication Attachment Type II (#1504) or Display And Printer Attachment Type II (#1502). See Table 1 for additional information. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes.

Display And Printer Attachment Type II (#1502): Provides in conjunction with feature #1505 and #1506 the capability for the attachment of 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to a maximum of 24. Limitations: Not available with Display And Printer Attachment Type I (#1501 or #9941) or Communication Attachment Type II (#1504). See Table 1 for additional information. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Field installation by purchase customer, see Note under Table 1. Prerequisites: #1503 or #9943.

Communication Attachment Type I (#1503): Provides the capability for the attachment of loops and communication ports in any combination up to a maximum of four. Additional special features for line control, communication interface and modems are required to complete each communication facility selected. Limitations: Not available with 8101 mdl A10. Not available with Display And Printer Attachment Type I (#1501). See Table 1 for additional information. Only available with port positions one through four. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Field installation by purchase customer, see Note under Table 1.

Communication Attachment Type II (#1504): Provides the capability for the attachment of loops and communication ports in any combination up to a maximum of four. Additional special features for line control, communication interface and modems are required to complete each communication facility selected. Limitations: Not available with Display and Printer Attachment Type II (#1502) or Display and Printer Attachment Type I (#1501 or #9941). See Table 1 for additional information. Only available with port positions five

through eight. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1503 or #9943.

Display And Printer Adapter (#1505): Provides for the attachment of the first four 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1501, #1502 or #9941.

Display And Printer, Add'l (#1506): Provides for the attachment of additional 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to a maximum of four. Maximum: Five. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1505.

TABLE 1

When configuring the 8101 for Display/Printer and Communication Features, the Type I Feature requirement should be determined first. The Type II should then be configured if so required. The table below shows the combinations of these features that may be configured.

8101 Mdl A10

Type I Type II

#9941 or
#9943 with #1502 or #1504

8101 Mdl A11 or A13

Type I Type II

#1501 or
#1503 with #1502 or #1504

Note: Purchase customer must submit an RPQ for field installation of #9943 with #1502 concurrent with removal of #9941 or field installation of #1503 with #1502 concurrent with removal of #1501.

Diskette Drive And Magnetic Tape Attachment (#1507): Provides the capability for the attachment of one Diskette Drive 2D (#4520) and one Magnetic Tape Attachment (#4521). Limitations: Only available with 8101 mdl A10. See special features #4520 and #4521 for Diskette Drive and Tape Attachment for the mdl A11 and A13. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes.

Diskette 2D Drive (#4520): Provides 1MB (985,088) of removable diskette storage for the 8101 mdl A10, A11 or A13 operating at a data rate of up to 62KB per second. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1507 for mdl A10.

Magnetic Tape Attachment (#4521): Provides for the attachment to the 8101 mdl A10, A11 or A13 of up to four 8809 Magnetic Tape Units, consisting of one 8809 mdl 1A plus two mdl 2s and one mdl 3. Limitations: Not available if the 8130, 8140 or 8150 Processor has the 8809 Magnetic Tape Unit mdl 1B attached or if the 8140 mdl BXX or CXX has Magnetic Tape Attachment (#4901). Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1507 for mdl A10.

Security Cover Locks (#6555): This feature provides key-operated security locks for the machine covers, restricting access to the machine interior and external cable connector area. See Security Lock, Diskette (#6566) if diskette security is required. Additional or replacement keys are not available from IBM. They maybe purchased from a local locksmith. Maximum: One. Field Removable: No. Field Installation: Yes.

Security Lock, Diskette (#6566): This feature provides a key-operated security lock to restrict access to the diskette magnetic media. It is accessible only by opening the front cover. For maximum system security, the Security Cover Lock (#6555) must be used in addition to the Diskette Security Lock. Additional or re-

placement keys are not available from IBM. They maybe purchased from a local locksmith. Maximum: One. Field Removable: No. Field Installation: Yes.

Selected Configurations

The following table lists the appropriate selected configuration codes for each mdl and the communication capabilities for each selected configuration.

	CODE							
	1	1	1	1	1	1	1	1
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	1
Description	0	2	3	4	5	6	8	9
	0							0
8101 mdl A10	-	X	X	X	X	X	X	X
8101 mdls								
A11, A13	X	X	X	X	X	X	X	X
Port 1 Dir Att Loop								
- 38.4KB	-	X	X	X	X	X	-	-
- 9.6KB	-	-	-	-	-	-	X	-
Port 2 Dir Att Loop								
9.6KB	-	X	X	-	X	X	X	X
Port 3 Data Link								
9.6KB	-	X	X	X	X	X	X	X
Port 4 Data Link								
9.6KB	-	-	-	X	X	-	X	X
Port 5 Data Link								
9.6KB	-	-	-	-	-	-	-	X
Port 6 Dir Att Loop								
9.6KB	-	-	X	-	-	X	-	-

Notes:

- Magnetic tape attachment to 8130 or 8140.
 - Use 8809 mdl 1B.
- Recommended DPPX configurations:
 - No less than 512K processor storage
 - No less than 58MB disk storage
 - Fixed Head feature in processor disk
- When attached to an 8140 mdl C processor with communication port features #1610, #1611, #1612, #1613 or #1614, or when attached to an 8150 processor with communication ports 1-4 or 9-12, Selected Configurations with 38,400 bps Loops are not available.

Selected Configuration Attachment (#1000): No communications available, mdls A11 and A13 only. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1002): Provides for selection and attachment on one single-lobe 38.4K bps loop in port 1, one 9600 bps single-lobe loop in port 2, and one SDLC link up to 9600 bps in port 3. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1003): Provides for selection and attachment of one single-lobe 38.4K bps loop in port 1, one 9600 bps single-lobe loop in port 2, one SDLC link up to 9600 bps in port 3, and one single-lobe 9600 bps loop in port 6. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1004): Provides for selection and attachment of one single-lobe 38.4K bps loop in port 1 and one SDLC link up to 9600 bps in port 3 and port 4. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1005): Provides for selection and attachment on one single-lobe 38.4K bps loop in port 1, one 9600 bps single-lobe loop in Port 2, one SDLC link up to 9600 bps in port 3 and port 4. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1006): Provides for selection and attachment on one single-lobe 38.4K bps loop in port 1, one 9600 bps single-lobe loop in port 2, one SDLC link up to 9600 bps in port 3 and port 4, and one single-lobe 9600 bps loop in port 6. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1008): Provides for selection and attachment of one single-lobe 9600 bps loop in port 1, one 9600 bps single-lobe loop in port 2, and one SDLC link up to 9600 bps in port 3. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1009): Provides for selection and attachment of one 9600 bps single-lobe loop in port 2, one SDLC link up to 9600 bps in port 3 and port 4. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Selected Configuration Attachment (#1010): Provides for selection and attachment of one 9600 bps single-lobe loop in port 2, and one SDLC link up to 9600 bps in port 3, port 4, and port 5. Maximum: One. Field Installation: No. Prerequisites: See Tables 4 and 5.

Communications And Loops

CCITT V.35 Interface (#1550): Provides interface to external modems/data communication equipment at up to 56,000 bps or Direct Connection at speeds of up to 56,000 bps. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC code 31 or two FAC codes 08, 09 or 8140 mdl C processor with #1610, #1611, #1612, #1613 or #1614, or 8150 processor with ports 1-4 or 9-12, and is not available when the 8101 is attached to the 8130 Processor. See Table 2 for system maximums. Maximum: For speeds up to 9600 bps, one per selected Communication feature (#1601 or #1602). For operation at speeds greater than 9600 bps, one per 8101, one per 8140/8101 or 8150/8101. Field Installation: Yes. Prerequisites: #1601, #1602 or #1602 and #5200. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

SDLC Communications With Business Machine Clock (#1601): Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems, direct connection and CCITT V.35 Interface. Limitations: In an 8100 System only ten Loops or SDLC communication ports may be active at one time, except for the 8150. The 8150 can support ten per Processing and Control Element (PCE). Maximum: Eight. See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1602, #1603 or #1604) selected. Field Installation: Yes. Prerequisites: #1503, #1504 or #9943. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications Without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21, CCITT X.21bis/V.28 Interface, CCITT V.35 Interface and Loop Adapter. Limitations: In an 8100 System only ten Loops or SDLC communication ports may be active at one time, except for the 8150. The 8150 can support ten per Processing and Control element (PCE). Maximum: Eight. See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1601, #1603 or #1604) selected. Field Installation: Yes. Prerequisites: #1503, #1504 or #9943. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC/SS Communications With Business Machine Clock (#1603): Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems or direct connection. Limitations: Start/Stop Communications are not available with integrated modems. An 8101 with an 8130 Processor attached, has a maximum aggregate BSC data rate of 9600 bps and 330 bps for Start/Stop. With an 8140 Processor attached, the maximum aggregate BSC data rate is 19,200 bps and 660 bps for Start/Stop. Mutually exclusive with the 8101-A2X feature #1605 or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer feature (#3220). Maximum: Eight. See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1601, #1602 or #1604) selected.

Field Installation: Yes. Prerequisites: #1503, #1504 or #9943. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC Communications Without Business Machine Clock (#1604): Provides control for EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface and direct connect. Limitations: An 8101 with an 8130 Processor attached, has a maximum aggregate BSC data rate of 9600 bps. With 8140 Processor attached, the maximum BSC aggregate data rate is 19,200 bps. Mutually exclusive with 8101-A2X feature #1605 or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer feature (#3220). Maximum: Eight. See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1601, #1602, or #1603) selected. Field Installation: Yes. Prerequisites: #1503, #1504 or #9943. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

PSNA (#2947): Provides for the attachment of Modem, Integrated, Switched (#5501) to the Public Switched Telephone Network. Maximum: One per Modem, Integrated, Switched (#5501). Field Installation: Yes. Prerequisites: #5501.

EIA RS-232/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface (#3701): Provides CCITT interface and cable for attachment of an external IBM modem or PTT mandatory modem complying with CCITT Recommendations (1976) V.24, V.28, ISO Standard 2110 and other relevant non-IBM modems may be attached subject to the Multiple Supplier Systems Bulletin. Maximum: One per selected Communication feature (#1601, #1602, #1603 or #1604). Field Installation: Yes. Prerequisites: #1601, #1602, #1603, #1604, #1602 and #5200, or #1604 and #5200. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 or 38,400 bps. Maximum: One per selected Communication feature (#1602). Only one of these features may operate at 38,400 bps in an 8130/8101, two in an 8140/8101, or 8150/8101 without ports 1-4 or 9-12 in the 8150. See Table 2 for system maximums. The maximum is reduced by one for each selected communication facility attached to the 8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: One per Communication Attachment Type I or II (#1503, #1504, or #9943). See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #4830. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400, (FAC 44 only) 4800, 9600 and 56,000 bps for direct connection. Can provide multiple speeds simultaneously. Maximum: One with Communication Attachment Type I (#1503, or #9943) for port positions one through four and one with Communication Attachment Type II (#1504) for port positions five through eight. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1503, #1504 or #9943 and either #1602 or #1604. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Modem, Integrated, Nonswitched (#5500): Provides interface to PTT or common carrier leased facilities at 600 or 1200 bps. Limitations: Not available for Start/Stop Communication Facilities. Maximum: One per selected Communication feature (#1601 or #1603). Field Installation: Yes. Prerequisites: #1601 or #1603. Specify: Code as provided in FAC description in the "Communication Capabilities" section. (Japan only > #2943 for NTT D-1 line service. <)

Modem, Integrated, Switched (#5501): (Not available in Japan.) Provides interface to PTT or common carrier switched facilities with auto answer at 600 or 1200 bps. Limitations: Not available with Start/Stop communication facilities. Maximum: One per selected communication feature (#1601). Field Installation: Yes. Prerequisites:

sites: #1601. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

(Japan only>X.21 Adapter For Nonswitched Networks (#5655): Provides interface for attachment to X.21 data communications equipment nonswitched at speeds up to 48,000 bps in point-to-point or multipoint configurations. Limitations: Operation at 48,000 bps is mutually exclusive with FAC codes 26, 28, 29 or two FAC codes 08, 09, or 8140 mdl C processor with #1610, #1611, #1612, #1613 or #1614, or 8150 processor with port 1-4 or 9-12, and is not available when the 8101 is attached to the 8130 processor. See Table 2 for system maximums. Maximum: One per selected Communications Feature (#1602). For operation at 48,000 bps, one per 8101, or one per 8140/8101 or 8150/8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.<)

8100 System Maximums: The following table lists the system maximums common to the 8130, 8140, 8150 and 8101, 8102. Depending on the processor and special features selected, these maximums may not be possible. See the appropriate machine pages for additional feature information.

Table 2

Machine/Feature Function	System Processor			
	8130 A21- A22 A23- A24	8140 B23 B24	8140 A31 A34	8140 A41 A44
8101, 8102 see Note	2	3	4	4
Disp/Prt Attch #1501, #1502, #9941	1	1	1	1
Comm Attch #1503, #9943	1	1	2	2
Comm Attch #1504	1	1	2	2
Diskette Drive	2	2	2	2
Tape Attachment	1	1	1	1
Comm Ports (SDLC, BSC/SS, Loop)	14	14	19	18
Loop at 38.4K bps	1	2*	2*	2*
Loop 2nd lobe	5	5	6	6
TP Link Greater than 9600 bps	0	1*	1*	1*
Multi-Speed clock	3	3	5	5

Machine/Feature Function	System Processor					
	8140 A51- A54 A61- A64 A71- A74	8140 B51- B52 B61- B62 B71- B72	8150 C72 C82 C92	8150 A10 A20 A30 A40	8150 B20 B40 B60 B80	
8101, 8102 see Note	4	4	4	8***	8***	
Disp/Prt Attch #1501						
#1502, #9941	1	1	1	1	1	
Comm #1503, #9943	2	1	1	1	1	
Comm Attch #1504	2	1	1	1	1	
Diskette Drive	2	2	2	2	2	
Tape Attch	1	1	1	1	1	
Comm Ports (SDLC, BSC/SS, Loop)	16	19	18	20	20	
Loop at 38.4K bps	2*	2*	2*	4**	6**	
Loop 2nd lobe	4	5	4	6	6	
TP Link Greater than 9600 bps	1*	1*	1*	4**	4**	
Multi-Speed clock	4	5	4	4	4	

* Either two loops at 38.4K bps or one loop at 38.4K bps and one TP Link greater than 9600 bps.

** Only if all ports are in the 8150 processor, otherwise the maximum is the same as the 8140 processors.

*** See "Extended Storage and I/O Unit Restrictions" in M8150 pages.

Note: Only one 8101 may have Communication and Display/Printer features with the 8130 Processor, 8140 Processor mdls BXX, CXX and 8150 Processor. Only two 8101 units may have Communication and Display/Printer features with the 8140 Processor, mdls A3X, A4X, A5X, A6X and A7X.

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	Sys* Max	Sys Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

MODEL CONVERSIONS

Field conversion is possible for models A10 to A11, A10 to A13 and A11 to A13.

ACCESSORIES

For accessories see M8130, 8140 or 8150 "Accessories".

SUPPLIES (NONE)
COMMUNICATION CAPABILITIES

There are a variety of Communication Facilities (see M2700) supported by the 8101 Features for Attaching Communications (FAC) differing in speed, protocol and attachment interfaces. These FAC codes have been categorized as Loop, SDLC, BSC and Start/Stop. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation FAC No.) for additional details. Refer to switched communications in the FAC codes, refers to the communication link between the 8100 System and the S/370 or 4300 processors.

The 8101 special features allow a maximum of eight communication capabilities to be configured and designated as communication ports. Each communication port position (1 through 8) must consist of a communications feature for SDLC, BSC or Start/Stop.

The SDLC communications feature is available with and without business machine clock (#1601, #1602). The BSC/SS communications feature (#1603) is available with business machine clock and the BSC communications feature (#1604) is available without business machine clock. If an 8101 communication port is to provide the attached facility with business machine clock at speeds of 2400 bps or greater for FAC 44, or 4800 bps or greater for other FAC codes, the multi-speed clock feature (#5200) is required.

In addition to selecting a communications feature (#1601, #1602, #1603, #1604) for each port configured in an 8101, a communication interface or integrated modem must be selected to support the Communication Facility attaching to that port. Direct connect at 2400 (FAC 44 only), 4800, 9600 and 56,000 bps require the multi-speed clock feature (#5200). Each port of the 8101 also requires the selection of a specify code to indicate the System 8100 FAC Code selected for that port. Certain System 8100 FAC codes will require a second specify code to select options available within that facility: 2/4-wire or line speed.

Note: Within a given FAC, the selected option (2/4-wire LPDA or line speed) can be changed in the field by Customer Engineering. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a FAC and its associated feature and specify codes must identify the original codes ordered from the factory.

Specify And FAC Code Descriptions: A specify code number is required to identify the selected FAC code and its physical port position. Communication Attachment Type I (#9943, #1503) is specified as port positions one through four and Communication Attachment Type II (#1504) is specified as port positions five through eight. The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9, e.g.:

#9ABC where AB = FAC No., and C = Port Position.

FAC codes range in number from 08 to 61 resulting in FAC specify codes ranging in number from #9081 to #9618. Additional codes must be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. Configuration Manual, GA27-2876, will aid in assigning the port positions.

LOOP

FAC No.	FAC Code Description
FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two lobe at 38,400 bps
FAC 10	Loop, single-lobe at 9600 bps
FAC 11	Loop, two-lobe at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Limitations: If two 08 FAC codes are specified, FAC codes 09, 26, 28, 29, 31 are not available. Not available with 8140 mdl C processor with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: One per 8130/8101, two in an 8140/8101 or 8150/8101. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify	Port 1	Port 2	Port 3	Port 4
Selection	#9081	#9082	#9083	#9084
Port				
Selection	Port 5	Port 6	Port 7	Port 8
Port	#9085	#9086	#9087	#9088

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: If two 09 FAC codes are specified, FAC codes 08, 26, 28, 29, 31 are not available. Not available with 8140 mdl C processor with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: One per 8130/8101, two in an 8140/8101. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify	Port 1	Port 2	Port 3	Port 4
Selection	#9091	#9092	#9093	#9094
Port				
Selection	Port 5	Port 6	Port 7	Port 8
Port	#9095	#9096	#9097	#9098

FAC 10 Loop, Single-Lobe: Required for operating a loop at 9600 bps. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3	Port 4
Selection	#9101	#9102	#9103	#9104
Port				
Selection	Port 5	Port 6	Port 7	Port 8
Port	#9105	#9106	#9107	#9108

FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Prerequisites: #1602, #4830 and #4835. Maximum: One for ports one through four and one for ports five through eight. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3	Port 4
Selection	#9111	#9112	#9113	#9114
Port				
Selection	Port 5	Port 6	Port 7	Port 8
Port	#9115	#9116	#9117	#9118

SDLC

FAC No.	FAC Code Description
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EIA RS-232-C/CCITT V.24/V.28,
CCITT X.21bis/V.28, CCITT X.21

- FAC 12 600 or 1200 bps (External modem)
- FAC 13 Up to 9600 bps (External modem)
- FAC 15 600, 1200 or 2400 bps Direct connect with clock (No modem)
- FAC 16 4800 or 9600 bps Direct connect with clock (No modem)
- FAC 17 Direct connect without clock to 9600 bps

Integrated Modem

- FAC 18 600 or 1200 bps nonswitched
- FAC 19 600 or 1200 bps switched with auto answer

CCITT V.35

- FAC 24 Direct connect with clock (No modem) 600, 1200 or 2400 bps
- FAC 25 Direct connect with clock (No modem) 4800 or 9600 bps
- FAC 26 Direct Connect with Clock (no modem) 56,000 bps
- FAC 27 Direct connect without clock (No modem) to 9600 bps
- FAC 28 Direct Connect without clock (no modem) to 56,000 bps
- FAC 29 Up to nonswitched.

CCITT X.21

- FAC 30 Up to 9600 bps nonswitched
- FAC 31 48,000 bps nonswitched

FAC 12 EIA RS-232-C/CCITT V.24/V.28 Interface: 600 or 1200 bps with business machine clock - operating with external modem without clocking - and point-to-point switched 2-wire - or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1601 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3	Port 4
Port		#9121	#9122	#9123	#9124
600 bps		#9741	#9742	#9743	#9744
1200 bps		#9751	#9752	#9753	#9754

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9125	#9126	#9127	#9128
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 13 EIA RS-232/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - with external data communication equipment and clock - point-to-point switched with auto answer to 9600 bps or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3	Port 4
Port		#9131	#9132	#9133	#9134
LPDA		#9801	#9802	#9803	#9804

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9135	#9136	#9137	#9138
LPDA	#9805	#9806	#9807	#9808

FAC 15 EIA RS-232-C/CCITT V.24/V.28 Interface: 600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 feet. Prerequisites: #1601 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3	Port 4
Port		#9151	#9152	#9153	#9154
600 bps		#9741	#9742	#9743	#9744
1200 bps		#9751	#9752	#9753	#9754
2400 bps		#9761	#9762	#9763	#9764

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9155	#9156	#9157	#9158
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758
2400 bps	#9765	#9766	#9767	#9768

FAC 16 EIA RS-232-C/CCITT V.24/V.28 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 feet. Limitations: One Multi-Speed Clock (#5200) is required for port position one through four or five through eight. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3	Port 4
Port		#9161	#9162	#9163	#9164
4800 bps		#9771	#9772	#9773	#9774
9600 bps		#9781	#9782	#9783	#9784

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9165	#9166	#9167	#9168
4800 bps	#9775	#9776	#9777	#9778
9600 bps	#9785	#9786	#9787	#9788

FAC 17 EIA RS-232-C/CCITT V.24/V.28 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 40 feet. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3	Port 4
Port		#9171	#9172	#9173	#9174

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9175	#9176	#9177	#9178

FAC 18 Integrated Modem: 600 or 1200 bps - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Prerequisites: #1601 and #5500. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3	Port 4
Port		#9181	#9182	#9183	#9184
2-wire					
600 bps		#9851	#9852	#9853	#9854
1200 bps		#9861	#9862	#9863	#9864
4-wire					
600 bps		#9741	#9742	#9743	#9744
1200 bps		#9751	#9752	#9753	#9754

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9185	#9186	#9187	#9188
2-wire				
600 bps	#9855	#9856	#9857	#9858
1200 bps	#9865	#9866	#9867	#9868

4-wire				
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 19 Integrated Modem(except Japan): 600 or 1200 bps - point-to-point switched with auto answer 2-wire. Prerequisites: #1601 and #5501. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9191	#9192	#9193	#9194
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9195	#9196	#9197	#9198
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 24 CCITT V.35 Interface: 600, 1200 or 2400 bps with business machine clock - operating with no modem (Attached machine must not provide business machine clock) - and direct connection up to 1,000 feet. Prerequisites: #1601 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9241	#9242	#9243	#9244
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754
2400 bps	#9761	#9762	#9763	#9764

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9245	#9246	#9247	#9248
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758
2400 bps	#9765	#9766	#9767	#9768

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (Attached machine must not provide business machine clock - and direct connection up to 1,000 feet. Limitations: One Multi-Speed Clock (#5200) is required for port position 1-4 or 5-8. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9251	#9252	#9253	#9254
4800 bps	#9771	#9772	#9773	#9774
9600 bps	#9781	#9782	#9783	#9784

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9255	#9256	#9257	#9258
4800 bps	#9775	#9776	#9777	#9778
9600 bps	#9785	#9786	#9787	#9788

FAC 26 CCITT V.35 Interface: 56,000 bps with business machine clock operating with no modem and direct connection up to 1,000 feet or up to a total cable length of 200 feet to a 3705. Limitations: Mutually exclusive with FAC codes 28, 29, 31 or two FAC codes 08, 09. Not available with 8140 mdl C processor with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. Not available when the 8101 is attached to the 8130 Processor. See Table 2 for system maximums. Maximum: One per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required code to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9261	#9262	#9263	#9264

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9265	#9266	#9267	#9268

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 1,000 feet. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9271	#9272	#9273	#9274

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9275	#9276	#9277	#9278

FAC 28 CCITT V.35 Interface: 56,000 bps without business machine clock operating with no modem and direct connection up to 1,000 feet to another 8100 system. Limitations: Mutually exclusive with FAC codes 26, 29, 31 or two FAC codes 08, 09. Not available with 8140 mdl C processor with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. Not available when the 8101 is attached to the 8130 Processor. See Table 2 for system maximums. Maximum: One per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required code to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9281	#9282	#9283	#9284

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9285	#9286	#9287	#9288

FAC 29 CCITT V.35 Interface: Up to 56,000 bps without business machine clock and external data communication equipment with clock, and point-to-point or multipoint nonswitched. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 31 or two FAC codes 08, 09. Not available with 8140 mdl C processor with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. Not available when the 8101 is attached to the 8130 Processor. See Table 2 for system maximums. Maximum: For operation at speeds greater than 9600 bps, one per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9291	#9292	#9293	#9294

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9295	#9296	#9297	#9298

(Japan only) FAC 30 CCITT X.21 Interface: Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify				
Selection	Port 1	Port 2	Port 3	Port 4
Port	#9301	#9302	#9303	#9304

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9305	#9306	#9307	#9308

FAC 31 CCITT X.21 Interface: 48,000 bps without business machine clock and point-to-point or multipoint nonswitched operation. Limitations: Mutually exclusive with FAC codes 26, 28, 29, or two FAC codes 08, 09. Not available with 8140 mdl C processor with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. Not available when 8101 is attached to the 8130 Processor. See Table 2 for system maximums. Maximum: One per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #5655.

Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	#9311	#9312	#9313	#9314

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9315	#9316	#9317	#9318<

BSC

FAC No. FAC Code Description

EIA RS-232-C/CCITT
V.24/V.28/CCITT X.21bis/V.28

FAC 40 600 or 1200 bps (External modem)
FAC 41 Up to 9600 bps (External modem)
FAC 44 2400, 4800 or 9600 bps direct
connect with clock (No modem)

Integrated Modem

FAC 45 600 or 1200 bps nonswitched

FAC 40 EIA RS-232-C/CCITT V.24/V.28 Interface: 600 or 1200 bps with business machine clock - operating with external modem with no clock - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitation: Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). BSC not available on an 8100 system that has an attached 8102 with Display and Printer feature (#3220). Prerequisites: #1603 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	#9401	#9402	#9403	#9404
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9405	#9406	#9407	#9408
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 41 EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - operating with external data communication equipment - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitation: Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). BSC not available on an 8100 system that has an attached 8102 with Display and Printer feature (#3220). Prerequisites: #1604 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	9411	#9412	#9413	#9414

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9415	#9416	#9417	#9418

FAC 44 EIA RS-232-C/CCITT V.24/V.28 Interface: 2400, 4800 or 9600 bps with business machine clock - operating with no modem (attached downstream terminal must not provide business machine

clock) - and direct connection to 40 feet. Limitations: One Multi-Speed Clock (#5200) is required for port position 1-4 or 5-8. Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC is not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). BSC not available on an 8100 system that has an attached 8102 with Display and Printer feature (#3220). Prerequisites: #1604, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	#9441	#9442	#9443	#9444
2400 bps	#9761	#9762	#9763	#9764
4800 bps	#9771	#9772	#9773	#9774
9600 bps	#9781	#9782	#9783	#9784

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9445	#9446	#9447	#9448
2400 bps	#9765	#9766	#9767	#9768
4800 bps	#9775	#9776	#9777	#9778
9600 bps	#9785	#9786	#9787	#9788

FAC 45 Integrated Modem: 600 or 1200 bps - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitation: Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). BSC not available on an 8100 system that has an attached 8102 with Display and Printer feature (#3220). Prerequisites: #1603 and #5500. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	#9451	#9452	#9453	#9454
2-wire				
600 bps	#9851	#9852	#9853	#9854
1200 bps	#9861	#9862	#9863	#9864
4-wire				
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9455	#9456	#9457	#9458
2-wire				
600 bps	#9855	#9856	#9857	#9858
1200 bps	#9865	#9866	#9867	#9868
4-wire				
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

START/STOP

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28

FAC 60 110, 134.5, 150, 300 or
600 bps (External modem)
FAC 61 110, 134.5, 150, 300 or 600 bps
Direct connect with clock
(No modem)

FAC 60 EIA RS-232-C/CCITT V.24/V.28 Interface: 110, 134.5, 150, 300, 600 bps with business machine clock - operating with external modem - and point-to-point nonswitched facilities. Will be provided under provisions of the IBM Multiple Supplier Systems Policy. See M2700 pages for specific information on communication facilities and other attachment information. Limitations: The 600 bps line

speed is not available when the 8101 is attached to an 8130 Processor. Prerequisites: #1603 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	#9601	#9602	#9603	#9604
110 bps	#9701	#9702	#9703	#9704
134.5 bps	#9711	#9712	#9713	#9714
150 bps	#9721	#9722	#9723	#9724
300 bps	#9731	#9732	#9733	#9734
600 bps	#9741	#9742	#9743	#9744

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9605	#9606	#9607	#9608
110 bps	#9705	#9706	#9707	#9708
134.5 bps	#9715	#9716	#9717	#9718
150 bps	#9725	#9726	#9727	#9728
300 bps	#9735	#9736	#9737	#9738
600 bps	#9745	#9746	#9747	#9748

FAC 61 EIA RS-232-C/CCITT V.24/V.28 Interface: 110, 134.5, 150, 300, 600 bps with business machine clock - operating with no modem (the attached terminal must provide its own business machine clock) - and direct connect to 40 feet. Limitations: The 600 bps line speed is not available when the 8101 is attached to an 8130 Processor. Prerequisites: #1603 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3	Port 4
Port	#9611	#9612	#9613	#9614

110 bps	#9701	#9702	#9703	#9704
134.5 bps	#9711	#9712	#9713	#9714
150 bps	#9721	#9722	#9723	#9724
300 bps	#9731	#9732	#9733	#9734
600 bps	#9741	#9742	#9743	#9744

Selection	Port 5	Port 6	Port 7	Port 8
Port	#9615	#9616	#9617	#9618
110 bps	#9705	#9706	#9707	#9708
134.5 bps	#9715	#9716	#9717	#9718
150 bps	#9725	#9726	#9727	#9728
300 bps	#9735	#9736	#9737	#9738
600 bps	#9745	#9746	#9747	#9748

DEVICE ATTACHMENT

Direct Attached Devices: The following devices can attach directly to the 8101 Storage and Input/Output Unit:

3277 Display Station mdls 1, 2
3284 Printer mdls 1, 2
3286 Printer mdls 1, 2
3287 Printer mdls 1, 2
3288 Line Printer mdl 2
3732 Text Display Station
3736 Printer
8809 Magnetic Tape Unit

Loop Attached Devices: The following devices can attach to a direct attached loop or to a data link attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

Device and Mdl	Loop Attachment		Data Link At 2400, 4800, 9600 bps
Direct	At..... 9600 bps 38400 bps	
3104 Display Terminal B1, B2		X X	X X
3230 Printer 1		X	X
3232 Keyboard Printer Terminal mdl 11	X	X	X
3262 Printer 2,12	(1)	X	(1)
3268 1	X	X	X
3274 Control Unit 51C,61C with:	X	X	X
- 3178 Display Station			
- 3179 Color Display Sta Mdl 1			
- 3179 Color Grphc Display Sta Mdl G1,G2			
- 3180 Display Station 1 (available only when emulating a 3278)			
- 3230 Printer 2			
- 3268 Printer 1			
- 3262 Printer 3,13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4,5			
- 3279 Color Display Unit 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3274 Control Unit 52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station 1 (available only when emulating a 3278)			
- 3268 Printer 2			
- 3278 Display Station 1,2,52			
- 3283 Printer 52			
- 3287 Printer 1,2			
3276 Control Unit Display Station 11,12,13,14 with:	X		X
- 3178 Display Station			

- 3179 Color Display Station			
- 3180 Display Station 1			
(available only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4			
- 3279 Color Display 2A, 2B, 3A, 3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3287 Printer 11,12	X	X	X
3289 Printer 3 with:	(1)		(1)
- 2502 Card Reader A1*			
- 3501 Card Reader			
- 3521 Card Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting Terminal 1,2	X		X
3642 Encoder Printer 1,2	X		X
3643 Keyboard Display 2,3,4	X		X
3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance	X		X
Terminal			
4701 Finance Communication			
Controller Mdl 1	X	X	X
5210 Printer E01, E02	X		
7426 Terminal Interface Unit 1,			
with associated terminals	X	X	X
8775 Display Terminal 1,2	X	X	X

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data see the M2700 pages and appropriate machine pages for additional information. Refer to the "IBM Information System Configurator", GA27-2876, for selection of 8100 FAC codes.

- Devices conforming to TTY 33/35 or equivalent
- 2741 Communication Terminal
- Terminals conforming to 2780/3780 line protocol
- 3101 Display Terminal mdls 10, 12, 13
- 3161 Display Station mdls 11, 12
- 3163 Display Station mdls 11, 12
- 3232 Keyboard Printer Terminal mdl 1
- 3274 Control Unit mdl 51C,61C with:
 - 3178 Display Station
 - 3179 Color Display Station mdl 1
 - 3179 Color Graphics Display Station mdls G1, G2
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3230 Printer mdl 2
 - 3268 Printer 2
 - 3262 Printer mdls 3, 13
 - 3278 Display Station mdls 1, 2, 3, 4, 5
 - 3279 Color Display Station mdls 2A, 2B, 3A, 3B
 - 3287 Printer mdls 1, 2, 1C, 2C
 - 3289 Line Printer mdls 1,2
- 3274 Control Unit mdl 52C with:
 - 3178 Display Station
 - 3180 Display Station 1 (available only when emulating a 3278)
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 52

- 3283 Printer mdl 52
- 3287 Printer mdls 1,2
- 3276 Control Unit Display Station mdls 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: (*These mdls are supported in SDLC mode.)
 - 3178 Display Station
 - 3179 Color Display Station (not supported on 3276 mdl 1)
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3230 Printer mdl 2
 - 3268 Printer 2
 - 3262 Printer mdl 13
 - 3278 Display Station mdls 1, 2, 3, 4 (See M3276 for configuration details.)
 - 3279 Color Display Station mdls 2A, 2B, 3A, 3B (Not supported on 3276 mdls 1, 2, 3, 4)
 - 3287 Printer mdls 1, 2, 1C, 2C
 - 3289 Line Printer mdls 1, 2
- 3600 Finance Communication Controllers
- 3630 Plant Communication Controllers
- 3651 Store Controllers mdls 25, 75
- 3684 Point of Sale Control Unit mdls 1, 2
- 3767 Communication Terminal mdls 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit
- 4700 Finance Communication Controller
- 4952, 4954, 4955, 4959 Processor (Series 1)
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6360, 6580 Displaywriter (3270 DSC Mode only)
- 6670 Information Distributor mdls 1, 2
- 7426 Terminal Interface Unit mdl 2, with associated terminals

MACHINES

- 8101 Storage and Input/Output Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 8775 Display Terminal mdls 11, 12

Direct Connection Attachment: In addition to terminal attachment to 8100 System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The direct connect is made by using SDLC (FAC 15, 16, 17, 24, 25, 26, 27 or 28), BSC (FAC 44) and Start/Stop (FAC 61). Shown below are the direct connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct connect cables.

Attaching Device	Speeds bps	Attaching Device Feature Number	8100 FAC Code
2741	134.5	#9114 and #3255	61
Devices Conforming to 2780/3780 Line Protocol	2400, 4800, 9600	Refer to specific device	44
3101, 3161	110, 150, 300	None required	61
3163	600*		
3232-1	1200, 2400	None	15
	4800, 9600	None	16
3274-51C, 61C	1200, 2400	#3701 and #6302	15
	4800, 9600	#3701 and #6302	16
	1200, 2400	#1550 and #6302	24
	4800, 9600	#1550 and #6302	25
	56,000	#1550 and #6303	26**
3276	600, 1200, 2400	#3701 w #9491 and #6302	15
	4800, 9600	#3701 w #9491 and #6302	16
3651			
25/75	4800	#2827	16***
3705-II	600, 1200, 2400	#4714	15
	4800, 9600	#4714	16
	56,000	#2944	26**
3705-80	600, 1200, 2400,	None	15
	4800, 9600	None	16
	56,000	#6712	26**
3725	600, 1200, 2400	#4911	15
	4800, 9600	#4911	16
	56,000	#4911	26**
3767	600, 1200, 2400	#3718 w #9707 and #9533	15
4701	1200, 2400	None	15
	4800, 9600	None	16
4952, 4954,	1200, 2400	#2090	15
4955, 4959	4800, 9600	#2090	16
6360	1200, 2400	#3707	15
	4800, 9600	#3707	16
6580 A04,	1200, 2400	#3705	15
B04	4800, 9600	#3705	16
6670-1, 2	600, 1200, 2400,	#9420	15
	4800	#9420	16
6670-2	9600	#9420	16
7426-2	600, 1200, 2400,	None	15
	4800, 9600	None	16
8101, 8130,	600, 1200, 2400	FAC 17 (see note)	15
8140, AXX,	600, 1200, 2400	FAC 27 (see note)	24
BXX	4800, 9600	FAC 17 (see note)	16



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	4800,9600	FAC 27 (see note)	25
8140 CXX	4800	#1621 and #9688 (See note)	16
8101,8140 BXX	56,000	FAC 28 (see note)	26**
8140 CXX	56,000	#1614 and #9683 (See note)	26**
8150	4800,9600	#1733 and #9688 or #1734 and #9698 (see note)	16
	56,000	#1742 and #9682 or #1745 and #9693 (see note)	26
8775	600,1200,2400	#3701	15
	4800,9600	#3701	16
	600,1200,2400	#1550	24
	4800,9600	#1550	25

* When 8101 is attached to a 8130, maximum speed is 300 bps.

1-#9134, 1-#9135, 1-#9921,
1-#9943

** Not available when 8101 is attached to 8130.

*** Specify #9770 is available to facilitate problem determination.

Note: Only the appropriate codes listed below may be specified in addition to the Selected Configuration code.**Note:** FAC 17, 27 or 28 in attaching 8101, 8130, 8140-AXX, BXX or #1614, #1621 on the 8140 mdl C or 8150 with #1733, #1734, #1742 or #1745 without business machine clock.

Power Plug/Cable: #9890, #9891, #9986.

Processor Attachment (8130, 8140): #9931, #9932.

Optional Feature Code: #6555 - Keylock, Security Cover.

Table 5 - Selected Configuration Codes

Selected Configuration Feature Code	Quantity-Component	Feature Code
#1000	None	
#1002	3-#1602, 1-#3701, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9921, 1-#9943	
#1003	1-#1504, 4-#1602, 1-#3701, 3-#4830, 1-#9081, 1-#9102, 1-#9106, 1-#9133, 1-#9921, 1-#9943	
#1004	3-#1602, 2-#3701, 1-#4830, 1-#9081, 1-#9133, 1-#9134, 1-#9921, 1-#9943	
#1005	4-#1602, 2-#3701, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9134, 1-#9921, 1-#9943	
#1006	1-#1504, 5-#1602, 2-#3701, 3-#4830, 1-#9081, 1-#9102, 1-#9106, 1-#9133, 1-#9134, 1-#9921, 1-#9943	
#1008	3-#1602, 1-#3701, 2-#4830, 1-#9101, 1-#9102, 1-#9133, 1-#9921, 1-#9943	
#1009	3-#1602, 2-#3701, 1-#4830, 1-#9102, 1-#9133, 1-#9134, 1-#9921, 1-#9943	
#1010	1-#1504, 4-#1602, 3-#3701, 1-#4830, 1-#9102, 1-#9133,	

: When the 8101s are attached to an 8140 mdl C processor with communication ports #1610, #1611, #1612, #1613 or #1614, or when attached to an 8150 processor with communication ports 1-4 or 9-12, Selected Configurations with 38,000 bps Loops are not available.

Table 6

Selected Configuration Feature Code	Quantity-Component	Feature Code
#1000	None	
#1002	1-#1503, 3-#1602, 1-#3701, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9921	
#1003	1-#1503, 1-#1504, 4-#1602, 1-#3701, 3-#4830, 1-#9081, 1-#9102, 1-#9106, 1-#9133, 1-#9921	
#1004	1-#1503, 3-#1602, 2-#3701, 1-#4830, 1-#9081, 1-#9133, 1-#9134, 1-#9921	
#1005	1-#1503, 4-#1602, 2-#3701, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9134, 1-#9921	
#1006	1-#1503, 1-#1504, 1-#1602, 2-#3701, 3-#4830, 1-#9081, 1-#9102, 1-#9106, 1-#9133, 1-#9134, 1-#9921	
#1008	1-#1503, 3-#1602, 1-#3701, 2-#4830, 1-#9101, 1-#9102, 1-#9133, 1-#9921	
#1009	1-#1503, 3-#1602, 2-#3701,	

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#1010 1-#4830, 1-#9102, 1-#9133,
1-#9134, 1-#9921
1-#1503, 1-#1504, 4-#1602,
3-#3701, 1-#4830, 1-#9102,
1-#9133, 1-#9134, 1-#9135,
1-#9921

Power Plug/Cable: #9890, #9891, #9986.
Processor Attachment (8130, 8140): #9931, #9932.
Optional Feature Code: #6555 - Security Cover Lock.

When the 8101s are attached to an 8140 mdl C processor with communication ports #1610, #1611, #1612, #1613 or #1614, or when attached to an 8150 processor with communication ports 1-4 or 9-12, Selected Configurations with 38,000 bps Loops are not available.

Notes: Only the appropriate codes listed below may be specified in addition to the Selected Configuration code.

8101 STORAGE AND I/O UNIT MODELS A20 - A25

PURPOSE

Provides additional disk storage and device attachment capability for the 8100 Information System.

MODELS A20, A23, A25

Model A20: Device attachment capability

Model A23: 64MB (64,520,192 bytes) - movable heads only and device attachments

Model A25: 128MB (129,040,384 bytes) - movable heads only and device attachments

Maximum: Two per 8100 Information System with an 8130 model A processor, three with an 8130 model B processor, four with 8140 processors, and eight with 8150 processors. The maximums are reduced by one if an 8809 Magnetic Tape Unit model 1B is attached to the processor and by one for each 8102 attached to the processor. See Table 2 for system maximums.

Prerequisites: 8130, 8140 or 8150 Processor for the mdls A20, A23 or A25. The 8101 mdl A20 requires one Display and Printer Attachment or Communication Attachment or Diskette Drive and Magnetic Tape Attachment.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8101 Storage and Input/Output Unit provides additional disk storage and device attachment capabilities for the 8100 Information System. The 8101 Storage and Input/Output Unit attaches to the I/O bus of the 8130, 8140 or 8150 Processor.

Disk storage for the 8101 Storage and I/O Unit mdls A23 and A25 is provided by a non-removable high-speed direct access storage. Depending on the mdl selected, disk storage of up to 128 million bytes with movable heads is available. The disk storage operates at a data rate of 1,031,000 bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds. Removable diskette storage of up to 1MB (985,088 bytes) is available for mdls A20, A23 and operates at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370 or 4300 Processor via the 3704, 3705 or 3725 Communications Controller for SNA/SDLC or BSC line control. The 8100 System can attach to the ICA of the 115, 125, 135 or 138 Processors for BSC line control. The 8100 System can attach to the Communications Adapter of the 4331 or 4361 Processor for BSC and/or SDLC line control. For specific attachment, see M2700 pages.

The 8101 Storage and I/O Unit extends the capability of the 8100 Information System by providing for the attachment of a variety of input/output devices. These devices consist of Displays, Printers, Magnetic Tape, Controllers and Data Collection Units. The devices may be attached to the 8101 loops, data link attached loops, communication ports or direct attachment to the 8101. 8100 System availability is enhanced by the Storage and I/O Unit Switch feature in the 8101. This feature allows the 8101 to be switched between two 8100 processors or between the two PCEs of an 8150 mdl BXX processor.

Physical security is provided through the use of key locks on the diskette drive and machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8101 Storage and I/O unit is designated as a customer setup unit, thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to enable the 8101 to be properly ordered and configured. Customer setup instructions will be shipped with each machine. An 8101 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given. If the user relocates and/or interchanges 8101 units from one system to another, the user must consider address compatibility of the processor and its attachments (see "System Attachment").

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An updated "8100 Information System Maintenance Manual", SY27-2521 should be requested by the 8100 servicing organization.

Configuration Considerations: Care must be exercised to ensure the following when ordering, installing or relocating an 8101 or 8102:

1. The address of an 8101/8102 is determined by the System Attachment specify code when the unit is ordered. There must be no 8101/8102s with duplicate System Attachment codes within the same 8100 system.
2. An 8101 with BSC communications (#1603 or #1604) cannot be attached to an 8100 system which has an attached 8102 with a Display and Printer attachment (#3220).
3. An 8101 with System Attachment code #9924 and Communications Attachment Type 1 (#1701 or #1702) and without Display and Printer Attachment (#3220) cannot be attached to an 8100 system that has an attaching 8102 with Display and Printer attachment #3220 and specify code #9936.
4. An 8101 with System Attachment code #9923 or #9924 and Communication Attachment Type 1 (#1701 or #1702) and without Display and Printer Attachment (#3220) cannot be attached to a system which has an attaching 8102 with Display and Printer Attachment #3320 and specify code #9937.
5. An 8101 with processor code #9931 or #9932 cannot be attached to an 8150 processor without an MES to change the processor attachment code to #9933.

Selected Configurations: To ease the selection, configuring, ordering and installation of 8101 Storage and Input/Output Units, several selected configurations have been developed. These selected configurations are designed to be applicable for the majority of customer installations. Both DPPX and DPCX are supported. The use of Selected Configurations is recommended. Traditional configuration selection and ordering should be used for configurations not included in the selected configurations.

Publications: GC20-8100.

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

- (Canada only > Voltage (AC, 1-phase, 3-wire, 60 Hz): #9890 for 120V with locking plug, #9891 for 120V with non-locking plug, #9884 for 208V with locking plug, #9894 for 240V with locking plug. Field Installation: Voltage conversions between 120V AC and 208/240V AC are not field installable. For conversion between 208V AC and 240V AC, contact your local CE representative.

- Cable: If 4.3m (14 ft) is not required, also specify #9986 for 1.8m (6 ft) cable. <)
- (Except Canada > Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
#2804 100V	#2730 100V
#2805 110V	#2822 110V
#2806 200V	#9911 120V
#2813 220V	#2823 127V
#2821 230V	#2732 200V
#2801 240V	#9902 208V
	#2803 220V
	#2831 240V<)

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

(Japan only > Specify #9890 for locking plug or #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated. <)

Note: (Except Canada and Japan) The 3-digit Country Code on the DP Machine will be used to select a power plug which matches the most commonly used power supply in the country.

- Color: Pebble gray is the only color available.
- Machine Nomenclature

Brazilian (Portuguese)	#2933
English US	#2924
Canadian French	#2935
Spanish Speaking	#2931

- Relocation: If the user relocates and/or interchanges an attaching 8101 from one 8100 system to another, the user must consider address compatibility of the processor and its attachments. For further information see "IBM 8100 Information System Site Planning Guide", GA27-3341. For relocation/replace kit ordering see Relocate/Replace 8100 System under M8130 or 8140 Accessories.
- Cabling: For loop cable information, see the M8130, 8140 or 8150 Accessories section, and the "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.
- Processor Attachment: Specify #9931 for 8130, #9932 for 8140, or #9933 for 8150. Field Installation: Yes. Note: When installing an 8101 with feature #4525 (Storage and I/O Unit Switch) to be switched between 8130 or 8140 processors, order #9939 for both processors. This is required only for the first such 8101 in the system whether the feature is field or factory installed or when the 8101 with the feature installed is being relocated. #9939 is required for 8150 if attaching 8101 in the range of #9925 thru #9928.
- System Attachment: Each 8101 requires a specify code to identify one of eight sets of I/O addresses. Specify one of the following codes for each 8101 attaching to the same processor: #9921, #9922, #9923, #9924, #9925, #9926, #9927 or #9928. These specify codes may be selected in any sequence. Duplicate codes are not permitted within a system. See "Extended Storage and I/O Unit Restrictions" in M8150 pages for additional limitations. Field Installation: Yes.
- Terminal Requirements: For attachment of 3640 family of terminals, see "Terminal Requirements" in M8130, 8140, 8150 pages.
- Industrial Automation Systems specify:

- Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, the communication facility, the operating system installed and the application work load. The maximum number of communications features which can be physically installed can exceed the operational capability. Increased processor utilization will result from sustained operation of BSC (#1603 and #1604) at the maximum aggregate data rate and may cause degradation of activity operating at lower priority levels. Analysis should be performed to determine the impact.

Note: Use of BSC 8101-A2X feature #1605 or 8140 mdl C features #1622 or #1623 or 8150 features #1763 or #1764 instead of features #1603 or #1604 will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System Publications are dependent on the presence of functional support modules provided by Distributed Processing Programming Executive (DPPX), Distributed Processing Control Executive (DPCX). Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the Functional Definition Manual 8100 which will be available from Mechanicsburg at FCS.

Display And Printer, Add'l (#1506): Provides for the attachment of additional 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to four. Maximum: Five. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #3220.

Diskette Drive And Magnetic Tape Attachment (#1507): Provides the capability for the attachment of one Diskette Drive 2D (#4520) and one Magnetic Tape Attachment (#4521). Limitations: Only available with 8101 mdl A20. See special features #4520 and #4521 for Diskette Drive and Tape Attachment for the mdl A23 and A25. #1507 is not available on 8101 mdl A20 with Storage and I/O Unit Switch feature (#4525). Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes.

Communication Attachment Type 1 and Type 2 (#1701): Provides the capability for the attachment of four loops and/or Communication Ports. The first #1701 (feature Type 1) provides for ports 1-4, the second #1701 (feature Type 2) provides for ports 5-8. Additional special features for line control, communication interface and modems are required to complete each communication port selected. Limitations: Port positions 5-8 not available with Display and Printer Attachment (#3220). Feature Type 1 (#1701) not available with feature type 1 (#1702) in ports 1-4. See Table 1 for additional information. Maximum: Two. Order once for port positions 1-4. Order again for port positions 5-8. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #3901 for first #1701 ports 1-4.

Communication Attachment Type 1 (#1702): Provides the capability for the attachment of four loops and/or communication ports for ports 1-4. Additional special features for line control, communications interface and DCE's are required to complete each communication port selected. Limitations: Available with Communications Attachment Type 2 (#1701) in ports 5-8 or Display and Printer Attachment (#3220). BSC/SS Communications (#1603 and #1604) are available with #1701 only. Maximum: One. Order for port positions 1-4. See table 2 for 8100 system maximums. Field Installation: Yes. Note: #1702 should be ordered if future requirements for the Pro-

grammed Communication Feature (#1605) are anticipated. Prerequisites: #3901.

Display And Printer Attachment (#3220): Provides for the attachment of 3277 Display Stations, 3732 Text Display and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to four. Can be expanded to a maximum of 24 devices with Display and Printer, Add'l (#1506). Limitations: Not available with Communication Attachment Type 2 (#1701), ports 5-8. See Table 1 for additional information. Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #3901 when ordered without #1701 or #1702 ports 1-4.

TABLE 1

When configuring the 8101 for Display/Printer and Communication, the table below shows the combinations of these features that may be configured.

```
#3901 -- PLUS -- #3220
OR
#3901 -- PLUS -- #1701 -- PLUS -- #1701
OR
#3901 -- PLUS -- #1701 -- PLUS -- #3220
OR
#3901 -- PLUS -- #1702 -- PLUS -- #1701
OR
#3901 -- PLUS -- #1702 -- PLUS -- #3220
```

Feature Expansion Prerequisite (#3901): Required for first Communications Attachment Type 1 (#1701 or #1702) ports 1-4 or Display and Printer Attachment (#3220) without Communications Attachment (#1701 or #1702). Limitations: Not available with Storage and I/O Unit Switch feature (#4525). Maximum: One. Field Installation: Yes. Prerequisites: #1701, #1702 or #3220.

Diskette Drive 2D (#4520): Provides 1MB (985,088 bytes) of removable diskette storage for the 8101 mdl A20 or A23 operating at a data rate of up to 62K bytes per second. Limitations: Not available with Storage and I/O Unit Switch feature (#4525). Maximum: One. See Table 2 for IBM System maximums. Field Installation: Yes. Prerequisites: #1507 for the mdl A20.

Magnetic Tape Attachment (#4521): Provides for the attachment to the 8101 mdl A20, A23 or A25 of up to four 8809 Magnetic Tape Units, consisting of one 8809 mdl 1A plus two mdl 2s and one mdl 3. Limitations: Not available if the 8130, 8140 or 8150 Processor has the 8809 Magnetic Tape Unit mdl 1B attached or if the 8140 mdl BXX or CXX has Magnetic Tape Attachment (#4901). Maximum: One. See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1507 for the mdl A20, or #4525.

Storage and I/O Unit Switch (#4525): Provides the capability of switching the 8101 mdls A20, A23, or A25 between any two attached 8130, 8140, or 8150 processors or between the two PCEs of an 8150 mdl BXX. The enclosed files and any attached 8809 Magnetic Tape Units will be switched. Switching may be accomplished under program control. Limitations: A maximum of two 8101s, 8102s or any combination thereof may be switched between any two processors with the exception that three may be switched between two 8130 mdl BXXs. Four units may be switched between the PCEs of a single 8150 BXX processor. Not available with Feature Expansion Prerequisite (#3901) or on 8101 mdl A20 with Diskette Drive and Magnetic Tape Attachment feature (#1507). Not available with Feature Expansion Prerequisite (#3901) or on 8101 mdl A23 or A25 with Diskette Drive 2D (#4520) or Feature Expansion Prerequisite (#3901). Maximum: One per 8101. Field Installation: Yes. Relocation B/Ms must be ordered as a prerequisite to field installation of the switch feature. Relocation B/Ms provide documentation and test diskettes (CSU) that are required before and after installation of the switch feature MES. Base relocation bills (not switch feature) must be ordered for all of the units that make up the system when the 8101 or 8102 has the switched feature added. Additionally, the "8100 Switch Planning Guide", GA23-0106, and the "8100 Site Planning Guide", GA27-2884, must be ordered to properly prepare for the relocation of the existing system and the installation of the "switched" systems after the installation of the switch feature.

Selected Configurations

The following table lists the appropriate selected configuration codes for each mdl and the communication capabilities for each selected configuration.

Description	CODE									
	1	1	1	1	1	1	1	1	1	1
	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	1	1
	0	2	3	4	5	6	8	9	0	1
8101 mdl A20	-	x	x	x	x	x	x	x	x	x
8101 mdls										
A23, A25	x	x	x	x	x	x	x	x	x	x
Port 1 Dir Att Loop										
- 38.4KB	-	x	x	x	x	x	-	-	-	x
- 9.6KB	-	-	-	-	-	-	x	-	-	-
Port 2 Dir Att Loop										
9.6KB	-	x	x	-	x	x	x	x	x	x
Port 3 Data Link										
9.6KB	-	x	x	x	x	x	x	x	x	x
Port 4 Data Link										
9.6KB	-	-	-	x	x	x	-	x	x	x
Port 5 Data Link										
9.6KB	-	-	-	-	-	-	-	-	x	x
Port 6 Dir Att Loop										
9.6KB	-	-	x	-	-	x	-	-	-	-
Port 7 Data Link										
9.6KB	-	-	-	-	-	-	-	-	-	x

Notes:

- Magnetic tape attachment to 8130 or 8140, use 8809 mdl 1B.
- Recommended DPPX configurations:
 - No less than 512K processor storage
 - No less than 58MB disk storage
 - Fixed Head feature in processor disk.
- When attached to an 8140 mdl C processor with communication port features #1610, #1611, #1612 #1613 or #1614 or when attached to an 8150 processor with communication ports 1-4 or 9-12, Selected Configurations with 38,400 bps loops are not available.

Selected Configuration Attachment (#1000): No communications --- mdls A23 and A25 only. See Table 5 for component feature. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1002): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 1, a 9600 bps, single-lobe loop in Port 2, and an SDLC link up to 9600 bps in Port 3. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1003): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 1, a 9600 bps, single-lobe loop in Port 2, an SDLC link up to 9600 bps in Port 3, and a single-lobe, 9600 bps loop in Port 6. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1004): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 1, and an SDLC link up to 9600 bps in Port 3 and Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1005): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 1, a 9600 bps, single-lobe loop in Port 2, and an SDLC link up to 9600 bps in Port 3 and Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1006): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 1, a 9600 bps, single-lobe loop in Port 2, and an SDLC link up to 9600 bps in Port 3 and Port 4, and a single-lobe, 9600 bps loop in Port 6. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1008): Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 1, a 9600 bps, single-lobe loop in Port 2, and an SDLC link up to 9600 bps in Port 3. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1009): Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 2, and an SDLC link up to 9600 bps in Port 3 and Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1010): Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 2, and an SDLC link up to 9600 bps in Port 3, Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Selected Configuration Attachment (#1011): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 1, a 9600 bps, single-lobe loop in Port 2 and Port 6, and an SDLC link up to 9600 bps in Port 3, Port 5 and Port 7. See Table 5 for component features. Maximum: One. Field Installation: Yes. Prerequisites: None.

Communications And Loops

CCITT V.35 Interface (#1550): Provides interface to external modems/data communication equipment up to 56,000 bps or Direct Connection at speeds of 9600 bps and at 56,000 bps. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC code 31, 33 or two FAC codes 08, 09 or 8140 mdl C processor with #1610, #1611, #1612, #1613 or #1614, or 8150 processor with ports 1-4 or 9-12, and is not available when the 8101 is attached to the 8130 Processor. See Table 2 for system maximums. Maximum: For speeds up to 9600 bps, one per selected Communication feature (#1601 or #1602). For operation at speeds greater than 9600 bps, one per 8101, one per 8140/8101 or 8150/8101. Field Installation: Yes. Prerequisites: #1601 or #1602 and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications With Business Machine Clock (#1601): Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems, direct connection and CCITT V.35 Interface. Limitations: In an 8100 System only ten loops or SDLC communication ports may be active at one time, except for the 8150. The 8150 can support ten per Processing and Control element (PCE). Maximum: Eight (per 8101). See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1602, #1603, #1604 or #1605) selected. Field Installation: Yes. Prerequisites: #1701 (Type 1 and Type 2) or #1702. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications Without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28, CCITT X.21 Interface, Direct Connection CCITT V.35 Interface and Loop Adapter. Limitations: In an 8100 System only ten loops or SDLC communications ports may be active at one time, except for the 8150. The 8150 can support ten per Processing and Control element (PCE). Maximum: Eight (per 8101). See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1601, #1603, #1604 or #1605) selected. Field Installation: Yes. Prerequisites: #1701 (Type 1 and Type 2) or #1702. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC/SS Communications With Business Machine Clock (#1603): Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems or direct connection. Limitations: Start/Stop Communications are not available with integrated modems. An 8101

with an 8130 Processor attached, the maximum aggregate BSC data rate is 9600 bps using #1603 and #1604 and 330 bps for Start/Stop. With an 8140 Processor attached, the maximum aggregate BSC data rate is 19,200 bps using #1603 and #1604, and 660 bps for Start/Stop. Not available in Communication Attachment Type 1 (#1702). Mutually exclusive with Programmed Communication Feature #1605 or 8140 mdl C Communication Ports Features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Maximum: Eight. See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1601, #1602, #1604 or #1605) selected. Field Installation: Yes. Prerequisites: #1701 (Type 1 and Type 2). Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC Communications Without Business Machine Clock (#1604): Provides control for EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface and direct connect. Limitations: An 8101 with an 8130 Processor attached, the maximum aggregate BSC data rate is 9600 bps using #1603 and #1604. With 8140 Processor attached, the maximum BSC aggregate data rate is 19,200 bps using #1603 and #1604. Not available in Communication Attachment Type 1 (#1702). Mutually exclusive with Programmed Communication Feature #1605 or 8140 mdl C Communication Ports Features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Maximum: Eight. See Table 2 for 8100 System maximums. The maximum is reduced by one for each Communication feature (#1601, #1602, #1603, #1604 or #1605) selected. Field Installation: Yes. Prerequisites: #1701 (Type 1 and Type 2). Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Programmed Communications Feature (#1605): Provides IBM microcode control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21 bis/V.28 BSC to external DCE with clocking from 1200-9600 bps, or without clocking at 600 or 1200 bps and direct connect with business machine clock at 1200, 1800, 2400, 3600, 7200 or 9600 bps. Speed and clocking options are user selected parameters. Processor utilization for #1605 is significantly reduced when substituted for features #1603 or #1604. Limitations: Available in ports 1-4 with #1702. Mutually exclusive with BSC features #1603 or #1604 in an 8100 system. Maximum: Four. See Table 2 for 8100 system maximums. The maximum is reduced by one for each communication feature (#1601 or #1602) selected. Field Installation: Yes. Prerequisites: #1702. Specify: Code as provided in FAC descriptions in "Communication Capabilities" section.

PSNA (#2947): Provides for the attachment of Modem, Integrated, Switched (#5501) to the Public Switched Telephone Network. Maximum: One per Modem, Integrated, Switched (#5501). Field Installation: Yes. Prerequisites: #5501.

EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 Interface (#3701): Provides interface to external modems/data communication equipment or direct connection at speeds up to 9600 bps. Maximum: One per selected Communication feature (#1601, #1602, #1603, #1604 or #1605). Field Installation: Yes. Prerequisites: #1601, #1602, #1603, #1604, #1605, #1602 and #5200, #1604 and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 or 38,400 bps. Maximum: One per selected Communication feature (#1602). Only one of these features may operate at 38,400 bps in an 8130/8101, two in an 8140/8101 or 8150/8101 without ports 1-4 or 9-12 in the 8150. See Table 2 for system maximums. The maximum is reduced by one for each selected communication facility attached to the 8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: One per Communication Attachment Type 1 and Type 2 (#1701 or #1702). See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites:

#4830. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400, (FAC 44 only) 4800 bps, 9600 bps and 56,000 bps for direct connection. Can provide multiple speeds simultaneously. Maximum: One with each Communication Attachment (#1701 or #1702). See Table 2 for 8100 System maximums. Field Installation: Yes. Prerequisites: #1701 and either #1602 or #1604 or #1702 and #1602. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Modem, Integrated, Nonswitched (#5500): Provides interface to PTT or common carrier leased facilities at 600 or 1200 bps. Limitations: Not available for Start/Stop Communication Facilities. Maximum: One per selected Communication feature (#1601 or #1603). Field Installation: Yes. Prerequisites: #1601 or #1603. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. (Japan only >#2943 for NTT D-1 line service. <)

Modem, Integrated, Switched (#5501): (Not available in Japan) Provides interface to PTT or common carrier switched facilities with auto answer at 600 or 1200 bps. Limitations: Not available with Start/Stop communication facilities. Maximum: One per selected Communication feature (#1601). Field Installation: Yes. Prerequisites: #1601. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

X.21 Adapter For Nonswitched Networks (#5655): Provides interface for attachment to X.21 data communications equipment nonswitched at speeds up to 48,000 bps in point-to-point or multipoint configurations via an DCE complying with CCITT Recommendation X.21. Limitations: Operation at 48,000 bps is mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09, 8140 mdl C processor with #1610, #1611, #1612, #1613 or #1614, or 8150 processor with ports 1-4 or 9-12, and is not available when the 8101 is attached to the 8130 processor. See Table 2 for system maximums. Maximum: One per selected Communications Feature (#1602). For operation at 48,000 bps one per 8101, one per 8140/8101 or 8150/8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.

X.21 Adapter For Switched Networks (#5656): Provides interface for attachment via a Data Circuit-terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in SRL GA27-3287 and is switched at speeds up to 48,000 bps. Limitations: Operation at greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 29, 31, or two FAC codes 08, 09 and is not available when the 8101 is attached to the 8130, 8140 mdl C with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. Maximum: One per selected Communications Feature (#1602). For operation at greater than 9600 bps, one per 8101, one per 8140/8101 or 8150/8101. Field Installation: Yes. Prerequisite: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.

8100 System Maximums: The following table lists the system maximums common to the 8130, 8140, 8150, 8101 and 8102. Depending on the processor and special features selected, these maximums may not be possible. See the appropriate machine pages for additional feature information.

TABLE 2

System Processor					
Machine/Feature Function	8130				
	A21-				
	A22	8130	8140	8140	
	A23-	B23	A31	A41	
	A24	B24	A34	A44	
8101, 8102 see Note	2	3	4	4	
Communication Atch:					
Type 1 and Type 2					
(#1701)	2	2	4	4	
Type 1 (#1702)	1	1	2	2	
Diskette Drive	2	2	2	2	
Tape Attachment	1	1	1	1	
Communication Ports					
(SDLC, BSC/SS, Loop)	14	4	19	18	
Loop at 38.4K bps	1	2*	2*	2*	
Loop 2nd lobe	5	5	6	6	
TP Link Greater than					
9600 bps	0	1*	1*	1*	
Multi-Speed clock	3	3	5	5	

System Processor					
Machine/Feature Function	8140	8140			
	A51-	B51-			
	A54	B52			
	A61-	B61-	8140	8150	8150
	A64	B62	C72	A10	B20
	A71-	B71-	C82	A20	B40
	A74	B72	C92	A30	B60
				A40	B80
8101, 8102					
see Note	4	4	4	8***	8***
Comm Atch:					
Type 1 and					
Type 2 #1701	4	2	2	2	2
Type 1 #1702	2	1	1	1	1
Diskette Drive	2	2	2	2	2
Tape Atch	1	1	1	1	1
Comm Ports					
(SDLC, BSC/SS,					
Loop)	16	19	18	20	20
Loop at					
38.4K bps	2*	2*	2*	4**	4**
Loop 2nd					
lobe	4	5	4	6	6
TP Link					
Greater than					
9600 bps	1*	1*	1*	4**	4**
Multi-Speed					
clock	4	5	4	4	4

* Either two loops at 38.4K bps or one loop at 38.4K bps and one TP Link greater than 9600 bps.

** Only if all ports are in the 8150 processor, otherwise the maximum is the same as the 8140 processors.

*** See "Extended Storage and I/O Unit Restrictions" in M8150 pages.

Note: Only one 8101 may have Communication and Display/Printer features with the 8130 Processor, 8140 Processor, mdls BXX or CXX and 8150 Processor. Only two 8101 units may have Communication and Display/Printer features with the 8140 Processor, mdls A3X, A4X, A5X, A6X and A7X.

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	System* Maximum	System Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

MODEL CONVERSIONS

Field conversion is possible for model A20 to A23, A20 to A25, and A23 to A25.

ACCESSORIES

For accessories, see the M8130, 8140 or 8150 Accessories section.

SUPPLIES (NONE)

COMMUNICATION CAPABILITIES

There are a variety of Communication Facilities (see M2700 pages) supported by the 8101 Features for Attaching Communications (FAC) differing in speed, protocol and attachment interfaces. These FAC codes have been categorized as Loop, SDLC, BSC and Start/Stop. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation FAC No.) for additional details. Refer to switched communications in the FAC codes, refers to the communication link between the 8100 System and the S/370 or 4300 processors.

The 8101 special features allow a maximum of eight communications capabilities to be configured and designated as communication ports. Each communication port position (1-8) must consist of a communications feature for SDLC, BSC or Start/Stop.

The SDLC communications feature is available with and without business machine clock (#1601, #1602). The BSC/SS communications feature (#1603) is available with business machine clock and the BSC communications feature (#1604) is available without business machine clock. If an 8101 communication port is to provide the attached facility with business machine clock at speeds of 2400 bps or greater for FAC 44, or 4800 bps or greater for other FAC codes, the multi-speed clock feature (#5200) is required. The Programmed Communications Feature (#1605) for BSC supports user parameters to select business machine clock options and speed from 600-900 bps, without the multispeed clock feature (#5200).

In addition to selecting a communications feature (#1601, #1602, #1603, #1604 or #1605) for each port configured in an 8101, a communication interface or integrated modem must be selected to support the Communication Facility attaching to that port. Direct connect at 2400, 4800, 9600 and 56,000 bps require the multi-speed clock feature (#5200).

Each port of the 8101 also requires the selection of a specify code to indicate the System 8100 FAC Code selected for that port. Certain System 8100 FAC codes will require a second specify code to select options available within the facility: 2/4 wire or line speed.

Note: Within a given FAC, the selected option (2/4-wire, LPDA or line speed) can be changed in the field by the Customer Engineer. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a FAC and its associated feature and specify codes must identify the original codes ordered from the factory.

Specify And FAC Code Descriptions: A specify code number is required to identify the selected FAC code and its physical port position. Port positions 1-4 are designated for Communications Attachment Type 1 (#1701 or #1702) and port positions 5-8 are designated for the second Communications Attachment Type 2 (#1701). The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9, e.g., #9ABC where AB = FAC No. and C = Port Position.

FAC codes range in number from 08 to 61 resulting in FAC specify codes ranging in number from #9081 to #9618. Additional codes must be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. Configuration Manual, GA27-2876, will aid in assigning the port positions.

LOOP

FAC No. FAC Code Description

FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two-lobe at 38,400 bps
FAC 10	Loop, single-lobe at 9600 bps
FAC 11	Loop, two-lobe at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Limitations: If two 08 FAC codes are specified, FAC codes 09, 26, 28, 29, 31 or 33 are not available. Not available with 8140 mdl C processor containing feature codes #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: One per 8130/8101, two in an 8140/8101 or 8150/8101. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for the port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9081	#9082	#9083	#9084
	Port 5	Port 6	Port 7	Port 8
Port	#9085	#9086	#9087	#9088

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: If two 09 FAC codes are specified, FAC codes 08, 26, 28, 29, 31 or 33 are not available. Not available with 8140 mdl C processor containing feature codes #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximum. Maximum: One per 8130/8101, two in an 8140/8101. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required codes to complete the configuration for the port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9091	#9092	#9093	#9094

Port	Port 5 #9095	Port 6 #9096	Port 7 #9097	Port 8 #9098
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FAC 10 Loop, Single-Lobe: Required for operating a loop at 9600 bps. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1 #9101	Port 2 #9102	Port 3 #9103	Port 4 #9104
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Port	Port 5 #9105	Port 6 #9106	Port 7 #9107	Port 8 #9108
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FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Prerequisites: #1602, #4830 and #4835. Maximum: One for ports 1-4 and one for ports 5-8. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC specify Selection	Port 1 #9111	Port 2 #9112	Port 3 #9113	Port 4 #9114
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Port	Port 5 #9115	Port 6 #9116	Port 7 #9117	Port 8 #9118
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SDLC

FAC No FAC Code Description

EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28

FAC 12	600 or 1200 bps (External modem)
FAC 13	Up to 9600 bps (External modem)
FAC 15	Direct connect with clock (No modem) 600, 1200 or 2400 bps
FAC 16	Direct connect with clock (No modem) 4800 or 9600 bps
FAC 17	Direct connect without clock up to 9600 bps

Integrated Modem

FAC 18	600 or 1200 bps nonswitched
FAC 19	600 or 1200 bps switched with auto answer

CCITT V.35

FAC 24	Direct connect with clock (No modem) 600, 1200 or 2400 bps
FAC 25	Direct connect with clock (No modem) 4800 or 9600 bps
FAC 26	Direct connect with clock (No modem) 56,000 bps
FAC 27	Direct connect without clock (No modem) up to 9600 bps
FAC 28	Direct connect without clock (No modem) 56,000 bps
FAC 29	Up to 56,000 bps nonswitched

CCITT X.21

FAC 30	Up to 9600 bps nonswitched
FAC 31	48,000 bps nonswitched
FAC 32	Up to 9600 bps switched
FAC 33	48,000 bps switched

FAC 12 EIA RS-232-C/CCITT V.24/V.28 Interface: 600 or 1200 bps with business machine clock - operating with external modem without clocking - and point-to-point switched 2-wire - or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites:

#1601 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1 #9121	Port 2 #9122	Port 3 #9123	Port 4 #9124
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754

Port	Port 5 #9125	Port 6 #9126	Port 7 #9127	Port 8 #9128
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 13 EIA RS-232/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - with external data communication equipment and clock - point-to-point switched with auto answer to 9600 bps or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1 #9131	Port 2 #9132	Port 3 #9133	Port 4 #9134
LPDA	#9801	#9802	#9803	#9804

Port	Port 5 #9135	Port 6 #9136	Port 7 #9137	Port 8 #9138
LPDA	#9805	#9806	#9807	#9808

FAC 15 EIA RS-232-C/CCITT V.24/V.28 Interface: 600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 feet. Prerequisites: #1601 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1 #9151	Port 2 #9152	Port 3 #9153	Port 4 #9154
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754
2400 bps	#9761	#9762	#9763	#9764

Port	Port 5 #9155	Port 6 #9156	Port 7 #9157	Port 8 #9158
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758
2400 bps	#9765	#9766	#9767	#9768

FAC 16 EIA RS-232-C/CCITT V.24/V.28 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 feet. Limitations: One Multi-Speed Clock (#5200) is required for port positions 1-4 and the second Multi-Speed Clock (#5200) for ports 5-8. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1 #9161	Port 2 #9162	Port 3 #9163	Port 4 #9164
4800 bps	#9771	#9772	#9773	#9774
9600 bps	#9781	#9782	#9783	#9784

Port	Port 5 #9165	Port 6 #9166	Port 7 #9167	Port 8 #9168
4800 bps	#9775	#9776	#9777	#9778
9600 bps	#9785	#9786	#9787	#9788

FAC 17 EIA RS-232-C/CCITT V.24/V.28 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 40 feet.

Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9171	#9172	#9173	#9174
	Port 5	Port 6	Port 7	Port 8
Port	#9175	#9176	#9177	#9178

FAC 18 Integrated Modem: 600 or 1200 bps - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Prerequisites: #1601 and #5500. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9181	#9182	#9183	#9184
2-wire				
600 bps	#9851	#9852	#9853	#9854
1200 bps	#9861	#9862	#9863	#9864
4-wire				
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754
	Port 5	Port 6	Port 7	Port 8
Port	#9185	#9186	#9187	#9188
2-wire				
600 bps	#9855	#9856	#9857	#9858
1200 bps	#9865	#9866	#9867	#9868
4-wire				
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 19 Integrated Modem (except Japan): 600 or 1200 bps - point-to-point switched with auto answer 2-wire. Prerequisites: #1601 and #5501. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9191	#9192	#9193	#9194
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754
	Port 5	Port 6	Port 7	Port 8
Port	#9195	#9196	#9197	#9198
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 24 CCITT V.35 Interface: 600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 1,000 feet. Prerequisites: #1601 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9241	#9242	#9243	#9244
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754
2400 bps	#9761	#9762	#9763	#9764
	Port 5	Port 6	Port 7	Port 8
Port	#9245	#9246	#9247	#9248
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758
2400 bps	#9765	#9766	#9767	#9768

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 1,000

feet. Limitations: One Multi-Speed Clock (#5200) is required for port positions 1-4 and the second Multi-Speed Clock (#5200) for ports 5-8. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9251	#9252	#9253	#9254
4800 bps	#9771	#9772	#9773	#9774
9600 bps	#9781	#9782	#9783	#9784
	Port 5	Port 6	Port 7	Port 8
Port	#9255	#9256	#9257	#9258
4800 bps	#9775	#9776	#9777	#9778
9600 bps	#9785	#9786	#9787	#9788

FAC 26 CCITT V.35 Interface: 56,000 bps with business machine clock - operating with no modem - and direct connection up to 1,000 feet or up to a total cable length of 200 feet to a 3705. Limitations: Mutually exclusive with FAC codes 28, 29, 31, 33 or two FAC codes 08, 09. Not available when the 8101 is attached to the 8130 Processor. Not available with 8140 mdl C processor containing feature codes #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: One per 8101, one per 8140/8101 or 8150/8101. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9261	#9262	#9263	#9264
	Port 5	Port 6	Port 7	Port 8
Port	#9265	#9266	#9267	#9268

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 1,000 feet. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9271	#9272	#9273	#9274
	Port 5	Port 6	Port 7	Port 8
Port	#9275	#9276	#9277	#9278

FAC 28 CCITT V.35 Interface: 56,000 bps without business machine clock - operating with no modem - and direct connection up to 1,000 feet to another 8100 System (with business machine clock). Limitations: Mutually exclusive with FAC codes 26, 29, 31, 33 or two FAC codes 08, 09. Not available when the 8101 is attached to the 8130 Processor. Not available with 8140 mdl C processor containing feature codes #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: One per 8101, one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9281	#9282	#9283	#9284
	Port 5	Port 6	Port 7	Port 8
Port	#9285	#9286	#9287	#9288

FAC 29 CCITT V.35 Interface: Up to without business machine clock and external data communication equipment with clock, and point-to-point or multipoint nonswitched. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 31, 33 or two FAC codes 08, 09. Not available when the 8101 is attached to the 8130 Processor. Not available with 8140 mdl C

processor containing feature codes #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: For operation at speeds greater than 9600 bps, one per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9291	#9292	#9293	#9294

	Port 5	Port 6	Port 7	Port 8
Port	#9295	#9296	#9297	#9298

(Japan only) > **FAC 30 CCITT X.21 Interface:** Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched via a DCE complying with CCITT Recommendation X.21. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9301	#9302	#9303	#9304

	Port 5	Port 6	Port 7	Port 8
Port	#9305	#9306	#9307	#9308

FAC 31 CCITT X.21 Interface: 48,000 bps without business machine clock and point-to-point or multipoint nonswitched operation via a DCE complying with CCITT Recommendation X.21. Limitations: Mutually exclusive with FAC codes 126, 28, 29, 33 or two FAC codes 08, 09. Not available when 8101 is attached to the 8130 Processor. Not available with 8140 mdl C processor containing feature codes #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. See Table 2 for system maximums. Maximum: One per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9311	#9312	#9313	#9314

	Port 5	Port 6	Port 7	Port 8
Port	#9315	#9316	#9317	#9318<

FAC 32 CCITT X.21 Interface: Up to 9600 bps without business machine clock and switched with auto answer and auto call. Prerequisites: #1602 and #5656. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9321	#9322	#9323	#9324

	Port 5	Port 6	Port 7	Port 8
Port	#9325	#9326	#9327	#9328

FAC 33 CCITT X.21 Interface: Up to 48,000 bps without business machine clock and switched auto answer and auto call. Limitations: Mutually exclusive with FAC codes 26, 28, 29, 31 or two FAC codes 08, 09. Not available when 8101 is attached to the 8130, 8140 mdl C with #1610, #1611, #1612, #1613 and #1614, or 8150 processor with ports 1-4 or 9-12. Maximum: One per 8101 or one per 8140/8101 or 8150/8101. Prerequisites: #1602 and #5656. Specify: From the table below specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9331	#9332	#9333	#9334

Port	Port 5	Port 6	Port 7	Port 8
	#9335	#9336	#9337	#9338

BSC

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28/
CCITT X.21bis/V.28

FAC 40	600 or 1200 bps (External modem)
FAC 41	Up to 9600 bps (External modem)
FAC 42	Up to 9600 bps (External modem)
FAC 44	2400, 4800 or 9600 bps direct connect with clock (No modem)
FAC 46	Direct connect 1200-9600 bps with clock (No modem)

Integrated Modem

FAC 45 600 or 1200 bps nonswitched

FAC 40 EIA RS-232-C/CCITT V.24/V.28 Interface: 600 or 1200 bps with business machine clock - operating with external modem with no clock - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1603, #1701 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9401	#9402	#9403	#9404
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754

	Port 5	Port 6	Port 7	Port 8
Port	#9405	#9406	#9407	#9408
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 41 EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - operating with external data communication equipment - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1604, #1701 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9411	#9412	#9413	#9414

	Port 5	Port 6	Port 7	Port 8
Port	#9415	#9416	#9417	#9418

EIA RS-232-C/CCITT V.24/V.28, CCITT X.21 bis/V.28 Interface: From 1200-9600 bps without business machine clock or 600 and 1200 bps with business machine clock --- operating with external DCE --- and point-to-point non-switched 2 or 4 wire --- or multipoint non-switched 4 wire. User parameter selection of business machine clock options and speed is supported. Limitations: Mutually exclusive with FAC codes, 40, 41, 44, 45 on an 8100 System. Prerequisites: #1605, #1702, and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

START/STOP

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9421	#9422	#9423	#9424

FAC 44 EIA RS-232-C/CCITT V.24/V.28 Interface: 2400, 4800 or 9600 bps with business machine clock - operating with no modem (attached downstream terminal must not provide business machine clock) - and direct connection to 40 feet. Limitations: One Multi-Speed Clock (#5200) is required for port positions 1-4 and the second Multi-Speed Clock (#5200) for ports 5-8. Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1604, #1701, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9441	#9442	#9443	#9444
2400 bps	#9761	#9762	#9763	#9764
4800 bps	#9771	#9772	#9773	#9774
9600 bps	#9781	#9782	#9783	#9784
	Port 5	Port 6	Port 7	Port 8
Port	#9445	#9446	#9447	#9448
2400 bps	#9765	#9766	#9767	#9768
4800 bps	#9775	#9776	#9777	#9778
9600 bps	#9785	#9786	#9787	#9788

FAC 45 Integrated Modem: 600 or 1200 bps - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Mutually exclusive with 8101-A2X FAC codes 42 or 46, or 8140 mdl C communication ports features #1622 or #1623 or 8150 features #1763 or #1764 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1603, #1701 and #5500. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9451	#9452	#9453	#9454
2-wire				
600 bps	#9851	#9852	#9853	#9854
1200 bps	#9861	#9862	#9863	#9864
4-wire				
600 bps	#9741	#9742	#9743	#9744
1200 bps	#9751	#9752	#9753	#9754
	Port 5	Port 6	Port 7	Port 8
Port	#9455	#9456	#9457	#9458
2-wire				
600 bps	#9855	#9856	#9857	#9858
1200 bps	#9865	#9866	#9867	#9868
4-wire				
600 bps	#9745	#9746	#9747	#9748
1200 bps	#9755	#9756	#9757	#9758

FAC 46 EIA RS-232-C/CCITT V.24/V.28 Interface: Up to 9600 bps with business machine clock --- for direct connection up to 40 feet (attached downstream terminal must not provide business machine clock). Business machine clock and speed are user selectable parameters at 1200, 1800, 2400, 3600, 7200, or 9600 bps. Prerequisites: #1605, #1702, and #3701. Limitations: Mutually exclusive with FAC codes 40, 41, 44, 45 on an 8100 System. Specify: From the table below, specify the required code to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9461	#9462	#9463	#9464

FAC No. FAC Code Description
EIA RS-232-C/CCITT V.24/V.28

FAC 60	110, 134.5, 150, 300 or 600 bps (External modem)
FAC 61	110, 134.5, 150, 300 or 600 bps Direct connect with clock (No modem)

FAC 60 EIA RS-232-C/CCITT V.24/V.28 Interface: 110, 134.5, 150, 300 and 600 bps with business machine clock - operating with external modem - and point-to-point nonswitched facilities. See M2700 pages for specific information on communication facilities and other attachment information. Limitations: The 600 bps line speed is not available when the 8101 is attached to an 8130 Processor. Prerequisites: #1603, #1701 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9601	#9602	#9603	#9604
110 bps	#9701	#9702	#9703	#9704
134.5 bps	#9711	#9712	#9713	#9714
150 bps	#9721	#9722	#9723	#9724
300 bps	#9731	#9732	#9733	#9734
600 bps	#9741	#9742	#9743	#9744
	Port 5	Port 6	Port 7	Port 8
Port	#9605	#9606	#9607	#9608
110 bps	#9705	#9706	#9707	#9708
134.5 bps	#9715	#9716	#9717	#9718
150 bps	#9725	#9726	#9727	#9728
300 bps	#9735	#9736	#9737	#9738
600 bps	#9745	#9746	#9747	#9748

FAC 61 EIA RS-232-C/CCITT V.24/V.28 Interface: 110, 134.5, 150, 300, 600 bps with business machine clock - operating with no modem (the attached terminal must provide its own business machine clock) - and direct connection up to 40 feet. Limitations: The 600 bps line speed is not available when the 8101 is attached to an 8130 Processor. Prerequisites: #1603, #1701 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3	Port 4
Port	#9611	#9612	#9613	#9614
110 bps	#9701	#9702	#9703	#9704
134.5 bps	#9711	#9712	#9713	#9714
150 bps	#9721	#9722	#9723	#9724
300 bps	#9731	#9732	#9733	#9734
600 bps	#9741	#9742	#9743	#9744
	Port 5	Port 6	Port 7	Port 8
Port	#9615	#9616	#9617	#9618
110 bps	#9705	#9706	#9707	#9708
134.5 bps	#9715	#9716	#9717	#9718
150 bps	#9725	#9726	#9727	#9728
300 bps	#9735	#9736	#9737	#9738
600 bps	#9745	#9746	#9747	#9738

DEVICE ATTACHMENT

Direct Attached Devices: The following devices can attach directly to the 8101 Storage and Input/Output Unit:

- 3277 Display Station mdls 1, 2
- 3284 Printer mdls 1, 2
- 3286 Printer mdls 1, 2
- 3287 Printer mdls 1, 2
- 3288 Line Printer mdl 2

3732 Text Display Station
3736 Printer
8809 Magnetic Tape Unit

Loop Attached Devices: The following devices can attach to a direct attached loop or to a data link attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

Device and Mdl	Loop Attachment		
Direct At..... 9600 bps 38400 bps	Data Link At 2400, 4800,9600 bps	
3104 Display Terminal B1, B2	X	X	X
3230 Printer 1	X	X	X
3232 Keyboard Printer Terminal mdl 11	X	X	X
3262 Printer 2,12	(1)	X	(1)
3268 Printer 1	X	X	X
3274 Control Unit 51C, 61C with:	X	X	X
- 3178 Display Station			
- 3179 Color Display Sta mdl 1			
- 3179 Color Grphcs Dsply Sta mdl G1,G2			
- 3180 Display Station 1			
(avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 3,13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4,5			
- 3279 Color Display Unit 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3274 Control Unit 52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station mdl 1			
(avail. only when emulating a 3278)			
- 3268 Printer 2			
- 3278 Display Station 1,2,52			
- 3283 Printer 52			
- 3287 Printer 1,2			
3276 Control Unit Display Station 11,12,13,14 with:	X		X
- 3178 Display Station			
- 3179 Color Display Station			
- 3180 Display Station 1			
(avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1, 2, 3, 4			
- 3279 Color Display 2A, 2B, 3A, 3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3287 Printer 11,12	X	X	X
3289 Printer 3 with:	(1)		(1)
- 2502 Card Reader A1*			
- 3501 Card Reader			
- 3521 Carder Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting Terminal 1,2	X		X
3642 Encoder Printer 1,2	X		X
3643 Keyboard Display 2,3,4	X		X
3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance Terminal	X		X
5210 Printer E1,E2	X		
4701 Finance Communication Controller mdl 1,2	X	X	X
7426 Terminal Interface Unit 1, with associated terminals	X	X	X
8775 Display Terminal 1,2	X	X	X

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data see the M2700 pages and appropriate machine pages for additional information. Refer to the "IBM Information System Configurator", GA27-2876, for selection of 8100 FAC codes.

- Devices conforming to TTY 33/35 or equivalent
- 2741 Communication Terminal
- Terminals conforming to 2780/3780 line protocol
- 3101 Display Terminal mdls 10, 12, 13
- 3161 Display Station mdl 11, 12
- 3163 Display Station mdl 11, 12
- 3232 Keyboard Printer Terminal mdl 1
- 3274 Control Unit mdl 51C, 61C with:
 - 3178 Display Station
 - 3179 Color Display Station mdl 1
 - 3179 Color Graphics Display Station mdls G1, G2
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
- 3230 Printer mdl 2
 - 3262 Printer mdls 3, 13
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 3, 4, 5
 - 3279 Color Display Station mdls 2A, 2B, 3A, 3B
 - 3287 Printer mdls 1, 2, 1C, 2C
 - 3289 Line Printer mdls 1, 2
- 3274 Control Unit mdl 52C with:
 - 3178 Display Station
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 52
 - 3283 Printer mdl 52
 - 3287 Printer mdls 1, 2
- 3276 Control Unit Display Station mdls 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: ("These mdls supported in SDLC mode.)
 - 3178 Display Station
 - 3179 Color Display Station (not supported on 3276 mdl 1)

- 3180 Display Station mdl 1 (available only when emulating a 3278)
- 3230 Printer mdl 2
- 3262 Printer mdl 13
- 3268 Printer 2
- 3278 Display Station mdls 1, 2, 3, 4 (See M3276 for configuration details.)
- 3279 Color Display Station mdls 2A, 2B, 3A, 3B (Not supported on 3276 mdls 1, 2, 3, 4)
- 3287 Printer mdls 1, 2, 1C, 2C
- 3289 Line Printer mdls 1, 2

- 3600 Finance Communication Controllers
- 3630 Plant Communication Controller
- 3651 Store Controllers mdls 25, 75
- 3684 Point of Sale Control Unit mdls 1, 2
- 3767 Communication Terminal mdls 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit
- 4700 Finance Communication Controller
- 4952, 4954, 4955, 4959 Processor (Series/1)
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Station
- 6360, 6580 Displaywriter (3270 DSC Mode only)
- 6670 Information Distributor mdls 1, 2
- 8101 Storage and Input/Output Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 7426 Terminal Interface Unit mdl 2, with associated terminals
- 8775 Display Terminal mdls 11, 12

Direct Connection Attachment: In addition to terminal attachment to 8100 System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The direct connect is made by using SDLC (FAC 15, 16, 17, 24, 25, 26, 27, or 28), BSC (FAC 44 or 46) and Start/Stop (FAC 61). Shown below are the direct connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct connect cables.

Attaching Device	Speeds bps	Attaching Device Feature No.	FAC Code
2741	134.5	#9114 and #3255	61
Devices Conforming to 2780/3780 Line Protocol	2400, 4800, 9600	Refer to specific device	44
	1200, 1800, 2400, 3600, 4800, 7200, 9600	Refer to specific device	46
3101, 3161, 3163	110, 150, 300, 600*	None required	61

*When 8101 is attached to the 8130, maximum speed is 300 bps.

3232-1	1200,2400 4800,9600	None None	15 16
3274-51C, 61C	1200,2400 4800,9600 1200,2400 4800,9600 56,000	#3701 and #6302 #3701 and #6302 #1550 and #6302 #1550 and #6302 #1550 and #6303	15 16 24 25 26**
3651 25/75	4800	#2827	16*
3276	600,1200,2400 4800,9600	#3701 w #9491 and #6302 #3701 w #9491 and #6302	15 16
3705-II	600,1200,2400 4800,9600 56,000	#4714 #4714 #2944	15 16 26**
3705-80	600,1200,2400, 4800,9600 56,000	None None #6712	15 16 26**
3725	600,1200,2400 4800,9600 56,000	#4911 #4911 #4911	15 16 26**
3767	600,1200,2400	#3718 w #9707 and #9533	15
4701	1200,2400 4800,9600	None None	15 16
4952,4954 4955,4959 6360	1200,2400 4800,9600 1200,2400 4800,9600	#2090 #2090 #3707 #3707	15 16 15 16
6580-A04, B04	1200,2400 4800,9600	#3705 #3705	15 16
6670-1,2	600,1200,2400 4800	#9420 #9420	15 16
6670-2	9600	#9420	16
7426-2	600,1200,2400 4800,9600	None None	15 16
8101,8130, 8140 AXX, BXX	600,1200,2400 600,1200,2400 4800,9600 4800,9600	FAC 17 (see note) FAC 27 (see note) FAC 17 (see note) FAC 27 (see note)	15 24 16 25
8140 CXX	4800	#1621 and #9688 (See Note)	16
8101,8140 BXX	56,000	FAC 28 (see note)	26**
8140 CXX	56,000	#1614 and #9683 (See Note)	26**
8150	4800, 9600 56,000	#1733 and #9688 or #1734 and #9698 (see note) #1742 and #9682 or #1745 and #9693 (see note)	16 26
8775	600,1200,2400 4800,9600 600,1200,2400 4800,9600	#3701 #3701 #1550 #1550	15 16 24 25

* Specify #9770 is available to facilitate problem determination.

** Not available when 8101 is attached to 8130.

Note: FAC 17, 27 or 28 in the attaching 8101, 8130, 8140 AXX, BXX or #1614, #1621 on the 8140 mdl C or 8150 with #1733, #1734, #1742 or #1745 without business machine clock.

SELECTED CONFIGURATIONS

Table 5
8101 Mdl A20, A23, A25
Selected Configuration Codes

Selected Configuration Feature Code	Quantity-Component	Feature Code
#1000	None	
#1002	3-#1602, 1-#1701, 1-#3701, 1-#3901, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9921	
#1003	4-#1602, 2-#1701, 1-#3701, 1-#3901, 3-#4830, 1-#9081, 1-#9102, 1-#9106, 1-#9133, 1-#9921	
#1004	3-#1602, 1-#1701, 2-#3701, 1-#3901, 1-#4830, 1-#9081, 1-#9133, 1-#9134, 1-#9921	
#1005	4-#1602, 1-#1701, 2-#3701, 1-#3901, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9134, 1-#9921	

#1006	5-#1602, 2-#1701, 2-#3701, 1-#3901, 3-#4830, 1-#9081, 1-#9102, 1-#9106, 1-#9133, 1-#9134, 1-#9921
#1008	3-#1602, 1-#1701, 1-#3701, 1-#3901, 2-#4830, 1-#9101, 1-#9102, 1-#9133, 1-#9921
#1009	3-#1602, 1-#1701, 2-#3701, 1-#3901, 1-#4830, 1-#9102, 1-#9133, 1-#9134, 1-#9921
#1010	4-#1602, 2-#1701, 3-#3701, 1-#3901, 1-#4830, 1-#9102, 1-#9133, 1-#9134, 1-#9135, 1-#9921
#1011	6-#1602, 2-#1701, 4-#3701, 1-#3901, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9134, 1-#9135, 1-#9137, 1-#9921

8101s when attached to an 8140 mdl C processor with communication ports: #1610, #1611, #1612, #1613 or #1614 or when attached to an 8150 processor with communication ports 1-4 or 9-12, Selected Configurations with 38,400 bps loops are not available.

Note: Only the appropriate codes listed below may be specified in addition to the Selected Configuration code.

- Power Plug/Cable: #9890, #9891, #9884, #9894, #9986.
- Processor Attachment (8130, 8140): #9931, #9932.
- Systems Attachment (Selected Configuration #1000 only): #9921, #9922, #9923, #9924.

8102 STORAGE and I/O UNIT MDLS A15 - A17
PURPOSE

Provides additional disk storage and device attachment capability for the 8100 Information System.

MODELS

Model A15	129MB (129,761,280 bytes)
Model A17	259MB (259,522,560 bytes)

Maximum: Two per 8100 Information System with an 8130 model A Processor, three with an 8130 model B Processor, four with an 8140 Processor, and eight with an 8150 Processor. The maximums are reduced by one if an 8809 Magnetic Tape Unit mdl 1B is attached to the processor and by one for each 8101 attached to the processor.

Prerequisites: 8130, 8140, or 8150 Processor.

Customer Setup: Machine only.

HIGHLIGHTS

The 8102 Storage and Input/Output Unit provides additional disk storage and device attachment capabilities for the 8100 Information System. The 8102 Storage and Input/Output Unit attaches to the I/O bus of the 8130, 8140 or 8150 Processor.

Disk storage for the 8102 Storage and I/O Unit mdls A15 and A17 is provided by a non-removable high-speed direct access storage device. Depending on the mdl selected, disk storage of up to 259 million bytes with movable heads is available. The mdl A15 contains a single disk drive and access mechanism. The mdl A17 contains two disk drives, each with its own access mechanism. The disk storage operates at a data rate of 1,031,000 bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds.

The 8100 system availability is enhanced by the Storage and I/O Unit Switch feature in the 8102. This feature allows the 8102 to be switched between two 8100 processors or between the two PCEs of an 8150 mdl BXX processor. Additionally, the Magnetic Tape Attachment and the Display and Printer Attachment feature are available in the 8102 Storage and I/O Unit.

Physical security is provided through the use of keylocks on the machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8102 Storage and I/O unit is designated as a customer setup unit, thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to enable the 8102 to be properly ordered and configured. Customer setup instructions will be shipped with each machine. An 8102 installation verification program will be shipped on a diskette with each machine. A clear indication that the machine is operational will be given.

Intermix: The 8101 and 8102 Storage and I/O Units may be intermixed on any 8100 System. Care must be exercised so there are no 8101s and/or 8102s with the same System Attachment specify codes (see "System Attachment" under "Specify").

Relocation/Replacement: If the user relocates and/or interchanges an attaching 8102 from one 8100 system to another, the user must consider address compatibility of the processor and its attachments. For further information, see *IBM 8100 Information System Site Planning Guide*, GA27-2884. For relocation/replace kit ordering, see "Relocate/Replace" 8100 System in M8130, 8140 or 8150 pages under "Accessories".

Configuration Considerations: Care must be exercised to ensure the following when ordering, installing or relocating of the 8101 or 8102.

1. The address of the 8101/8102 is determined by the System Attachment specify code when the unit is ordered. There must be no 8101/8102 with duplicate System Attachment codes within the same 8100 System.
2. An 8102 with Display and Printer Attachment (**#3220**), cannot be attached to a system that has BSC Communications (**#1603**) or **#1604** in the processor or an attaching 8101.
3. An 8102 with Display and Printer Attachment (**#3220**) with specify **#9936**, cannot be attached to a system that has an attaching 8101 with System Attachment Code **#9924** and Communications Attachment Type 1 (**#1503**, **#1701**, **#1702** or **#9943**) and without Display and Printer Attachment (**#1502** or **#3220**).
4. An 8102 with Display and Printer Attachment (**#3220**) with specify **#9937**, cannot be attached to a system that has an attaching 8101 with System Attachment Code **#9923** or **#9924** and Communica-

tions Attachment Type 1 (**#1503**, **#1701**, **#1702** or **#9943**) and without Display and Printer attachment (**#1502** or **#3220**).

5. When attaching the first 8102 to an 8130 or 8140 Processor, then order **#9939** for the processor. This specify code supplies updated maintenance documentation and must be ordered as early as possible in order to assure its availability when the 8102 is installed.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System Publications, are dependent on the presence of functional support modules provided by Distributed Processing Programming Executive/System Product (DPPX/SP Release 2). Operation and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX should provide the functional support as contained and described in the *8100 Functional Definition Manual* which will be available from Mechanicsburg at FCS.

Bibliography: GC20-8100

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture.

- Power (200V to 240V AC, 1-phase, 3-wire): For 50 Hz, specify **#0805** ... for 60 Hz, specify **#0806**. The power cable shipped with each machine will be 4.3m (14 ft) long.

(Japan only+)

Specify **#9890** for locking plug, **#9891** for non-locking plug. If **#9890** or **#9891** are not specified, a cord without a plug will be shipped unless a country RPQ is initiated. +)

(Except Japan+)

Note: The 3-digit Country Code on the DP machine order sheet will be used to select a power plug which matches the most commonly used power supply in the country +)

- Color: Pebble gray is the only available color.
- Machine Nomenclature:

Canadian French **#2935** Spanish **#2931**
English US **#2924**

- Processor Attachment: Specify **#9931** for 8130, **#9932** for 8140, or **#9933** for 8150. **Field Installation:** Yes.

Note: If attaching the first 8102 to an 8130 or 8140 Processor, order **#9939** for the processor. If a Storage and I/O Switch feature (**#4525**) is ordered, also order **#9939** for both processors to which the 8102 will be attached. **#9939** is required for 8150 if attaching 8102 in the range of **#9925** thru **#9928**.

- System Attachment: Each 8102 or 8101 requires a specify code to identify one of eight I/O addresses. Specify one of the following codes for each 8102 or 8101 attaching to the processor: **#9921**, **#9922**, **#9923**, **#9924**, **#9925**, **#9926**, **#9927**, or **#9928**. These specify codes may be selected in any sequence. Duplicate codes are not permitted within a system. See "Extended Storage and I/O Unit Restrictions" in M8150 pages for additional limitations. **Field Installation:** Yes.

SPECIAL FEATURES

Display and Printer, Add'l (#1506): Provides for the attachment of additional 3277 Displays and 3284, 3286, 3287 and 3288 Printers in any combination up to four. **Maximum:** Five. **Field Installation:** Yes. **Prerequisites:** **#3220**.

Display and Printer Attachment (#3220): Provides for the attachment of 3277 Displays, and 3284, 3286, 3287 and 3288 Printers in any combination up to four. Can be expanded to a maximum of 24 devices with Display and Printer Add'l (**#1506**). **Limitations:** Not available if the processor or an 8101 has BSC Communications (**#1603** or **#1604**). **#9936** (first 8102 with **#3220**) not available if there is an 8101 with **#9924** and the 8101 has Communication Attachment Type 1 (**#1503**, **#1701**, **#1702**, or **#9943**) without Display and Printer Attachment Type 2 (**#1502** or **#3220**). **#9937** (second 8102 with **#3220**) is not available if there is an 8101 with **#9923** or **#9924** and the 8101 has Communication Attachment Type 1 (**#1503**, **#1701**, **#1702** or **#9943**) without Display and Printer Attachment Type 2 (**#1502** or **#3220**). Do not order an MES to change **#9936**/**#9937**. Contact your CE representative. **Maximum:** One per 8102. Two per 8100 System. **Field Installation:** Yes. **Specify:** **#9936** for first 8102 with **#3220** and **#9937** for second 8102 with **#3220**.

8102 Storage and I/O Unit Mdls A15 - A17 (cont'd)

Magnetic Tape Attachment (#4521): Provides for the attachment to the 8102 mdl A15 or A17 of up to four 8809 Magnetic Tape Units, consisting of one 8809 mdl 1A plus two mdl 2s and one mdl 3. **Limitations:** Not available if the 8130, 8140 or 8150 Processor has the 8809 Magnetic Tape Unit mdl 1B attached or if the 8140 mdl B or mdl C has Magnetic Tape Attachment (#4901). **Maximum:** One per 8100 System. **Field Installation:** Yes.

Storage and I/O Unit Switch (#4525): Provides the capability of switching the 8102 mdl A15 or A17 between any two attached 8130, 8140, or 8150 Processors or between the two PCEs of an 8150 mdl BXX. The enclosed files, any attached 8809 Magnetic Tape Units and any terminals attached to a Display and Printer Attachment (#3220) will be switched. Switching may be accomplished under program control. **Limitations:** A maximum of two 8101s, 8102s, or a combination thereof may be switched between any two 8100 processors with the exception that three may be switched between two 8130 BXXs. Four units may be switched between the two PCEs of a single 8150 BXX processor. **Maximum:** One per 8102. **Field Installation:** Yes. Relocation B/Ms must be ordered as a prerequisite to field installation of the switch feature. Relocation B/Ms provide documentation and test diskettes (CSU) that are required before and after installation of the switch feature MES. Base relocation bills (not switch feature) must be ordered for all of the units that make up the system which the 8101 or 8102 that will have the the switch feature added, is a part of. Additionally, the *8100 Switch Planning Guide*, GA23-0106, and the *8100 Site Planning Guide*, GA27-2884, must be ordered to properly prepare for the relocation of the existing system and the installation of the "switched" systems after the installation of the switch feature.

MODEL CONVERSIONS

Model change from model A15 to A17 is field installable.

ACCESSORIES

For accessories, see the M8130, 8140, or 8150 Accessories section.

SUPPLIES (None)**DEVICE ATTACHMENT**

Direct Attached Devices: The following devices can attach directly to the 8102 Storage and Input/Output Unit:

- 3277 Display Station mdls 1, 2
- 3284 Printer mdls 1, 2
- 3286 Printer mdls 1, 2
- 3287 Printer mdls 1, 2
- 3288 Line Printer mdl 2
- 8809 Magnetic Tape Unit mdl 1A

8130 PROCESSOR MODELS A21, A22, A23, A24

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

(NO LONGER AVAILABLE)

PURPOSE

The 8130 Processor provides control, storage, processing capability, disk and diskette storage, and device attachment capabilities for the 8100 Information System.

MODELS A21, A22, A23, A24

(NO LONGER AVAILABLE)

The following models of the 8130 are available depending on processor storage size and non-removable disk storage size. Some models have fixed head capability as well as movable heads for the non-removable, high speed, direct access disk storage. All 8130 models include removable diskette storage with up to 1 million bytes of storage.

Mdl	Base Processor Storage (bytes)	Non-removable Disk Capacity (million bytes)	Fixed Head Capacity (bytes)
A21	256K (262,144)	29MB (29,327,360)	None
A22	256K (262,144)	23MB (23,146,888)	131,072
A23	256K (262,144)	64MB (64,520,192)	None
A24	256K (262,144)	58MB (58,654,720)	131,072

Customer Setup (CSU): Machine Only

HIGHLIGHTS

The 8130 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8130 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions and up to eight I/O hardware interrupt levels provide for interrupt processing. The 8130 provides 256K (262,144) bytes of processor storage that can be expanded to a maximum of 1,024K (1,048,576) bytes and provision for dynamic addressing and storage protection for up to 4 million bytes of logical storage.

The 8130 with a special feature for system expansion provides for the attachment of up to two 8101 or 8102 Storage and I/O Units or one 8101 or 8102 Storage and I/O Unit and one 8809 Magnetic Tape Unit mdl 1B. An alternate configuration can consist of an 8130, two 8101 or 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit mdl 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit mdl 1A or 1B.

The 8130 Processor is provided with fixed high speed direct access storage. Depending on the 8130 mdl selected, disk storage of up to 64 million bytes with movable heads or up to 58 million bytes of disk storage with movable and fixed heads is available. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds. Removable diskette storage is available with up to 1MB (985,088) of storage operating at up to 62K bytes per

second data rate. The diskette drive can read/write in basic data exchange format on either the diskette 2D or the diskette Type 1.

The 8100 System can attach to any S/370, 4300 or 9370 processor via the 3704, 3705, 3720 or 3725 for SNA/SDLC or BSC line control. The 8100 System can attach to the ICA of the 115, 125, 135, or 138 Processors for BSC line control. The 8100 System can attach to the Communications Adapter of the 4331 or 4361 Processor for BSC and/or SDLC line control. For specific attachment, see M2700 pages.

The capability of the 8100 Information System is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8130 via communication features which include data link, direct connect, and loops that are direct attached or data link attached loops. The 8130 provides for the attachment of two communication ports which can be expanded by optional features up to a maximum of six. With the 8101 Storage and I/O Unit attached, the communication ports physically attached can be further increased by eight, providing an 8100 System maximum of 14 communication ports.

Customer Setup: The 8130 Processor is designated as a customer setup unit thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8130. Setup procedures for the customer will be shipped with each machine. An 8130 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multi-use Communications Loop Planning and Installation Guide", GA27-3341 and "Installation Guide", GA23-0039, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Selected Configurations: To ease the selection, configuring, ordering, and installation of an 8130 Processor, several selected configurations have been developed. These selected configurations are designed to be applicable for the majority of customer installations. Both DPPX and DPCX are supported. The use of selected configurations is recommended. Traditional configuration selection and ordering should be used by configurations not included in the selected configurations. For additional information see "Selected Configurations Ordering Guide" ZZ20-4598.

Publications: GC20-8100.

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture.

- (Except Canada > Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803
	240V #2831<)

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

(Canada only> Canada will use the same power cords and plugs as used in the U.S. Specify #9891 for nonlocking or #9890 for locking plug. If 4.3m (14 ft) power cable is not desired, specify #9986 for 1.8m cable.<)

(Japan only> Specify #9890 for locking plug or #9891 for nonlocking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a Country RPQ is initiated.<)

(Except Canada and Japan> Note: The 3 digit Country Code on the DP machine order sheet will be used to select a power plug which matches the most commonly used power supply in the Country.<)

- Color: Pebble gray is the only color available.
- Machine Nomenclature:

Brazilian	#2938	English	#2924
Canadian Fr	#2935	Spanish	#2931

- Relocation: If the user relocates and/or interchanges an attaching 8101 or 8102 from one 8100 system to another, the user must consider address compatibility of the processor and its attachments. For further information see "IBM 8100 Information System Site Planning and Guide", GA27-2884. For relocation/ replace kit ordering, see Relocate/ Replace 8100 System under "Accessories".
- Cabling: For loop information see "Accessories" and the "IBM Multi-use Communication Loop-Planning Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.
- Programming Configuration: Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations. Field Installation: Yes.
- 8101/8102 Attachment: Order #9939 for the first 8102 being attached to any model 8130 or 8140 processor. If the 8102 has feature # 4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and secondary processors. This specify code supplies updated maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.
- Industrial Automation Systems specify:
 - Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, communication facility, the operating system installed and the application work load. The maximum number of communications facilities which can be physically installed can exceed the operational capability. Increased processor utilization will result from sustained operation of BSC, #1603 (NO LONGER AVAILABLE) and #1604 (NO LONGER AVAILABLE), at the maximum aggregate data rate and may cause degradation of activity

operating at lower priority levels. Analysis should be performed to determine the impact.

Note: Use of BSC 8101 A2X feature #1605 (NO LONGER AVAILABLE) instead of features #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System Publications are dependent on the presence of functional support modules provided by DPPX, DPCX. Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the Functional Definition Manual 8100 which will be available from Mechanicsburg at FCS.

System Expansion (#1530): Provides programmable hardware interrupt levels and sublevel interrupt determination. Required for attachment of up to two 8101 or 8102 Storage and I/O Units or one 8101 or 8102 and/or one 8809 Magnetic Tape Unit mdl 1B directly to the 8130. Maximum: One per 8130. Field Installation: Yes.

Processor Storage Type 1 (#1710): (NO LONGER AVAILABLE)

Provides 128K (131,072) bytes of additional processor storage. Limitations: Not available if Processor Storage Type 2 (#1720) is selected. Maximum: One per 8130. Field Installation: Yes.

Processor Storage Type 2 (#1720): Provides 256K (262,144) bytes of additional processor storage. For 512K byte configuration specify #9961. For 768K byte configuration specify #9962. For 1,024K byte configuration specify #9963. Limitations: Not available if Processor Storage Type 1, #1710 (NO LONGER AVAILABLE) is selected. Maximum: Three per 8130. Field Installation: Yes.

Keylock (#4655): (NO LONGER AVAILABLE)

This Keylock Feature provides processor security by the selection of three modes of operation. These consist of:

- Disable power on and disable operator panel
- Enable power on but disable operator panel
- Enable power on and enable operator panel

Additional or replacement Keys are not available from IBM. They may be purchased from a local locksmith. Maximum: One. Field Installation: Yes. Field Removable: No.

Security Cover Locks (#6555): (NO LONGER AVAILABLE)

This feature provides key operated security locks for the machine covers, restricting access to the machine interior and external cable connector area. See Security Lock, Diskette, #6566 (NO LONGER AVAILABLE), if diskette security is required. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith. Maximum: One. Field Installation: Yes. Field Removable: No.

Security Lock, Diskette (#6566): (NO LONGER AVAILABLE)

This feature provides a key operated security lock to restrict access to the diskette magnetic media. It is accessible only by opening the front cover. For maximum system security, the Security Cover Lock, #6555 (NO LONGER AVAILABLE), must be used in addition to the Diskette Security Lock. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith. Maximum: One. Field Installation: Yes. Field Removable: No.

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	System* Maximum	System Units Which May Have Display Printer Features
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MACHINES

8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

Selected Configurations

The following table lists the appropriate selected configuration codes for each mdl and the communication capabilities for each selected configuration.

Description	CODE							
	1	1	1	1	1	1	1	1
8130 mdl A21, A22	0	0	0	0	0	0	0	0
A23, A24	0	0	0	0	0	0	0	1
Port 1 Dir Att Loop	1	2	4	5	7	8	9	0
- 38.4KB	X	X	X	X	X	X	X	X
- 9.6KB	-	-	-	-	-	X	-	-
Port 2 Dir Att Loop	-	X	-	X	X	X	X	X
9.6KB	-	X	-	X	X	X	X	X
Port 3 Data Link	X	X	X	X	X	X	X	X
9.6KB	X	X	X	X	X	X	X	X
Port 4 Data Link	-	-	X	X	-	-	X	X
9.6KB	-	-	X	X	-	-	X	X
Port 5 Data Link	-	-	-	-	-	-	-	X
9.6KB	-	-	-	-	-	-	-	X
Port 6 Dir Att Loop	-	-	-	-	-	-	-	-
9.6KB	-	-	-	-	-	-	-	-

Notes:

- Magnetic tape attachment to 8130.
 - use 8809 mdl 1B.
- Recommended DPPX configurations:
 - No less than 512K processor storage
 - No less than 58MB disk storage
 - Fixed Head feature in processor disk

Selected Configuration Attachment (#1001): (NO LONGER AVAILABLE)

Provides for selection and attachment of one single lobe 38.4K bps Loop in Port 1 and one SDLC link up to 9600 bps in Port 3. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1002): (NO LONGER AVAILABLE)

Provides for selection and attachment of one single-lobe 38.4K bps Loop in Port 1, one 9600 bps single-lobe loop in Port 2, and one SDLC link up to 9600 bps in Port 3. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1004): (NO LONGER AVAILABLE)

Provides for selection and attachment of one single-lobe 38.4K bps loop in Port 1 and one SDLC link up to 9600 bps in Port 3 and Port

4. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1005): (NO LONGER AVAILABLE)

Provides for selection and attachment of one single-lobe 38.4K bps loop in Port 1, one 9600 bps single-lobe loop in Port 2, one SDLC links up to 9600 bps in Port 3, and Port 4. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1007): (NO LONGER AVAILABLE)

Provides for selection and attachment of one 9600 bps single lobe loop in Port 2 and one SDLC link up to 9600 bps in Port 3. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1008): (NO LONGER AVAILABLE)

Provides for selection and attachment of one single-lobe 9600 bps loop in Port 1, one 9600 bps single-lobe loop in Port 2, and one SDLC link, up to 9600 bps in Port 3. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1009): (NO LONGER AVAILABLE)

Provides for selection and attachment of one 9600 bps single-lobe loop in Port 2, one SDLC link up to 9600 bps in Port 3 and Port 4. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

Selected Configuration Attachment (#1010): (NO LONGER AVAILABLE)

Provides for selection and attachment of one 9600 bps single lobe loop in Port 2 and one SDLC link up to 9600 bps in Port 3, Port 4 and Port 5. Maximum: One. Field Installation: No. Prerequisites: See Table 1.

COMMUNICATIONS AND LOOPS

CCITT V.35 Interface (#1550): Provides interface for data transmission over direct connection at speeds up to 9600 bps. Maximum: One per selected Communication feature #1601, (NO LONGER AVAILABLE) or #1602. Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE), #1602 or #1602 and #5200.

SDLC Communications With Business Machine Clock (#1601): (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 interface, integrated modems, direct connection and CCITT V.35 Interface. Limitations: In an 8100 System only ten loop or SDLC communication ports may be active at one time. Maximum: Six. Maximum is fourteen per 8100 System (See note) with an 8130. The maximum is reduced by one for each Communication feature, #1602, #1603 (NO LONGER AVAILABLE), or #1604 (NO LONGER AVAILABLE). Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications Without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21, CCITT X.21bis/V.28 interface, CCITT V.35 Interface and Loop Adapter. Limitations: In an 8100 System only ten loop or SDLC communication ports may be active at one time. Maximum: Six. Maximum is 14 per 8100 System (See note) with an 8130. The maximum is reduced by one for each Communication feature, #1601 (NO LONGER AVAILABLE), #1603 (NO LONGER AVAILABLE), or #1604 (NO LONGER AVAILABLE). Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC/SS Communications With Business Machine Clock (#1603): (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 interface, integrated modems or direct connection. In an 8100 System the maximum aggregate BSC data rate is 9600 bps and 330 bps for Start/Stop. Limitations: Start/Stop communications not available with integrated modems. BSC mutually exclusive with 8101 A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Maximum: Six. Maximum is fourteen per 8100 System (See note) with an 8130. The maximum is reduced by one for each Communication feature, #1601 (NO LONGER AVAILABLE), #1602, or #1604 (NO LONGER AVAILABLE). Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC Communications Without Business Machine Clock (#1604):
(NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28/CCITT X.21 bis/V.28 interface and direct connect. Limitations: In an 8100 System the maximum aggregate BSC data rate is 9600 bps. BSC mutually exclusive with 8101 A2X FAC Codes 42 (NO LONGER AVAILABLE), or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Maximum: Six. Maximum is fourteen per 8100 System (See note) with an 8130. The maximum is reduced by one for each Communication feature, #1601 (NO LONGER AVAILABLE), #1602, or #1603 (NO LONGER AVAILABLE). Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

PSNA (#2947): (NO LONGER AVAILABLE)

Provides for the attachment of Modem, Integrated, Switched (#5501 (NO LONGER AVAILABLE)) to the Public Switched Telephone Network. Maximum: One per Modem, Integrated, Switched, #5501 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #5501 (NO LONGER AVAILABLE).

EIA RS232/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface (#3701): Provides CCITT interface and cable for attachment of an external IBM modem or PTT mandatory modem complying with CCITT Recommendations (1976) V.24, V.28, ISO Standard 2110 and other relevant non-IBM modems may be attached subject to the Multiple System Supplier Bulletin. Maximum: One per selected Communication feature, #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), or #1604 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE) and #5200. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

See IBM.

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 or 38,400 bps. Maximum: Six. Maximum is fourteen per 8100 System (See note) with an 8130. Only one of these features may operate at 38,400 bps in an 8130/8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: Three per 8130. Maximum is five per 8100 Information System (See note) with an 8130. Field Installation: Yes. Prerequisites: #4830. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Note: An 8100 System consisting of an 8130 Processor and attached 8101 Storage and I/O Units.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400, (FAC 44 only - NO LONGER AVAILABLE) 4800 bps and 9600 bps for direct connection. Can provide multiple speeds simultaneously. Limitations: Available for port positions 3-6 only. Maximum: One. Maximum is three per 8100 System with an 8130. Field Instal-

lation: Yes. Prerequisites: #1602 or #1604 (NO LONGER AVAILABLE). Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Modem, Integrated, Nonswitched (#5500): (NO LONGER AVAILABLE)

Provides interface to PTT or common carrier leased facilities at 600 or 1200 bps. Limitations: Not available for Start/Stop Communications Facilities. Maximum: One per selected Communication feature, #1601 (NO LONGER AVAILABLE), or #1603 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE) or #1603 (NO LONGER AVAILABLE). Specify: Code as provided in FAC description in the "Communication Capabilities" section. (Japan only > , #2943 (NO LONGER AVAILABLE) for NTT D-1 line service. <)

Modem, Integrated, Switched (#5501): (NO LONGER AVAILABLE)

(Except Japan) Provides interface PTT or common carrier switched facilities with auto answer at 600 or 1200 bps. Limitations: Not available with Start/Stop communication facilities. Maximum: One per selected Communication feature, #1601 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE).

Specify: Code as provided in FAC description in the "Communication Capabilities" section.

X.21 Adapter For Nonswitched Networks (#5655): Provides for the attachment of point-to-point or multipoint nonswitched communication facilities at speeds up to 9600 bps via DCE complying with CCITT Recommendation X.21. Maximum: One per selected Communications Feature (#1602). Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communications Capabilities" section.

X.21 Adapter For Switched Networks (#5656): Provides interface for attachment via a Data Circuit-terminating Equipment (DCE) which complies with CCITT Recommendation X.21, as it is delineated in GA27-3287, switched at up to 9600 bps. Maximum: One per (#1602). Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description "Communications Capabilities" section.

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

The following mdl changes can be field installed. Mdl upgrade may require replacement of disk storage unit. Adequate provisions must be made for retaining data contained on disk storage unit and elimination of user-proprietary information.

	To	A22	A23	A24
From				
A21		X	X	X
A22		-	X	X
A23		-	-	X

ACCESSORIES

Cables - Loop

Loop cables can be purchased from IBM or a customer-selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

- Other Loop Cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multi-use Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
 - Indoor Cable P/N 1657265: UL approved (style 2919) for interconnection of low voltage electronic equipment. Maximum allowable cable temperature range is -34 degrees C to +80 degrees C.
 - Indoor Cable P/N 7838694: UL approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34 degrees C to +90 degrees C.
 - Indoor Cable P/N 7838695: UL approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34 degrees C to +105 degrees C.
 - Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34 degrees C to +80 degrees C.
 - Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34 degrees C to +80 degrees C.
 - Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft).

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1000 to 2000 ft). Additional lengths up to 609.6m (2000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8m (1000 ft).

Exterior cable (P/N 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3,000 ft), by specifying the length wanted. Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

Loop - Accessories

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multi-use Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

2 x 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called radials. The point where a radial line terminates at the LWC is called an LWC port. Not all ports have to be used; unused ports can be reserved for future expansion. The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer supplied volt-ohmm, capable of reading 0.5 ohms and rated at least 5000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohmm to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

System Loop Accessories:

- Order via MES from Raleigh:
- 1657300, Loop Splice Plate (LSP) (indoor)
- 1657310, Loop Station Connector (Radial LSC)
- 1657320, Loop Station Connector (Wrap LSC)
- 1657260, Loop Station Connector Gasket
- 1657330, Loop Wiring Concentrator (LWC)
- 1657332, LWC Circuit Board Assy (order instead of LWC-1657330) *
- 1657350, Loop Surge Suppressor (LSS)
- 1657354, LSS Circuit Board Assy (order instead of LSS-1657350) *
- 1657420, Continuity and Relay Tester
- 1657325, Wrap Switch Access Cover
- 1657379, Loop Accessory Keys (10 spares) **
- 7838771, 2 x 4 Adapter Plate (2AP)

Order via MES from Fujisawa:

- 2102151, Conventional Box (indoor) 5 x 10cm - (2 x 4 inches)
- 2100264, Clamp (for cable to indoor box)
- 1657280, Environmental Box (outdoor) 7 x 11.5cm - (2.75 x 4.5 inches) (For industrial use)
- 2114285, Environmental Clamp - small (for indoor cable to environmental box)
- 1657377, Environmental Clamp - large (for outdoor cable to environmental box)

- 1657292, Metric conduit adapter
- 1657305, Environmental Enclosure - NEMA - 4X 36 x 30 x 15cm (14 x 12 x 6 in.)
- 1657306, Environmental Enclosure Mtg Panel
- 1657307, Sealing - Locknut

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** One package (10 keys) shipped with each 8101 or 8130. One key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use Machine type 8101 or 8130.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments. However, see local CE management and GI section 65 for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multi-use Communications Loop Planning and Installation Guide", (GA27-3341) for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the Branch Office.

To enable a customer to test his installed loops it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

Relocate/Replace Kits: (Except French Canadian and Spanish.) The material required to perform machine relocation or processor replacement has been grouped into machine type dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8130 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit Without Packaging Material	Kit With Packaging Material	Relocate Package
8101, 8102	4448550	4448551	N/A
8101, 8102 (with FC4525)	6226687	6226686	N/A
8130	4448552	4448553	N/A

For 8100 Information Systems without 8101 or 8102 storage and I/O units attached:

- Use Figure 2 below to order appropriate kit B/M.
- Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without 8101
or 8102 Attached - English

Machine	Kit Without Packaging Material	Kit With Packaging Material	Relocate Package
8130	4448575	4448576	N/A

Kits For Systems With 8101 or
8102 Attached - Spanish

Machine	Kit Without Packaging Material	Kit With Packaging Material	Relocate Package
8101, 8102	6226492	6226496	N/A
8101, 8102 (with FC4525)	6423302	6423301	N/A
8130	6226493	6226497	N/A

Kits For Systems Without 8101 or
8102 Attached - Spanish

8130	6226500	6226503	N/A
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Kits For Systems With 8101 or
8102 Attached - French Canadian

8101, 8102	6226590	6226594	N/A
8101, 8102 (with FC4525)	6423304	6423303	N/A
8130	6226591	6226595	N/A

Kits For Systems Without 8101 or
8102 Attached - French Canadian

8130	6226598	6226601	N/A
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Kits For Systems With 8101 or
8102 Attached - Japanese

8101, 8102	6423295	6423296	N/A
8101, 8102 (with FC4525)	6423297	6423298	N/A
8130	6423279	6423280	N/A

Kits For Systems Without 8101 or
8102 Attached - Japanese

8130	6423281	6423282	N/A
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- Check for missing/damaged wrap plugs. If required, see the wrap plug entry in this section of the Sales Manual.
- Ordering Information: (Canada only) Order via MSORDER (category = supplies/ accessories Group Code = DP Supply Order) (Japan only) Order via MES from Fujisawa.

Wrap Plugs: The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3.

Figure 3

Communication Feature	Communi- cation Cable Group Number	Wrap Plug Part Number
Loop Station Adapter (Single Lobe)	#3709	7389282
DDSA	#3717	6835350
V.35 Modem	#3718	6835348
V.35 Direct Connect	#3719	6835349
V.35 Direct Connect PT TO PT	#3720	6835642
EIA Direct Connect	#3721	6835642
EIA Modem	#3724	6835346
Loop Station Adapter (Double Lobe)	#3726	7389282
EIA Direct Connect PT to PT	#3727	6835347
X.21	#3728	6835379

Ordering Information: Via Branch Office, Code 'S' from Mechanicsburg.

SUPPLIES (NONE)

COMMUNICATION CAPABILITIES

There are a variety of Communication Capabilities (see M2700 pages) supported by the 8130 Features for Attaching Communications (FAC) differing in speed, protocol and attachment interfaces. These FAC codes have been categorized as LOOP, SDLC, BSC and START/STOP. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation FAC No.) for additional details. Refer to switched communications in the FAC codes, refer to the communication link between the 8100 System and the S/370 or 4300 Processor.

The 8130 special features allow a maximum of six communication capabilities to be configured and designated as communication ports. Each communication port position (1-6) must consist of a communications feature for SDLC, BSC or Start/Stop.

The SDLC communications feature is available with and without business machine clock, #1601 (NO LONGER AVAILABLE), #1602. The BSC/SS communications feature, #1603 (NO LONGER AVAILABLE), is available with business machine clock and the BSC communications feature, #1604 (NO LONGER AVAILABLE), is available without business machine clock. If an 8130 communication port is to provide the attached facility with business machine clock at speeds of 2400 bps or greater for FAC 44 (NO LONGER AVAILABLE), or 4800 bps or greater for other FAC codes, the multi-speed clock feature (#5200) is required. One Multi-Speed Clock feature (#5200) can provide business machine clocking to any or all of port positions 3-6.

In addition to selecting a Communications feature, #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE) for each port configured in an 8130, a communication interface or integrated modem must be selected to support the Communication Facility attaching to that port. A two lobe loop port requires three special features (#1602, #4830 and #4835). Direct connect at 2400, (FAC 44 only - NO LONGER AVAILABLE) 4800 and 9600 bps requires the multi-speed clock feature (#5200). Each port of the 8130 also requires the selection of a specify code to indicate the 8100 System FAC Code selected for that port. Certain 8100 System FAC codes will require a second specify code to select options available within that facility: 2/4 wire or line speed. Note: Within a given FAC, the selected option (2/4 wire, LPDA or line speed) can be changed in the field by Customer Engineering. All such changes are chargeable at the applicable CE rate. Do not submit an MES. However, the MES for removal of a FAC and

its associated feature and specify codes must identify the original codes ordered from the factory.

Specify And FAC Code Descriptions: A specify code number is required to identify the selected FAC code and its physical port position. The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9, e.g.:

#9ABC where AB = FAC No., and C = Port Position.

FAC codes range in number from 08 to 61* resulting in FAC specify codes ranging in number from #9081 to #9616. (Some FAC codes are NO LONGER AVAILABLE. Refer to FAC code descriptions for availability.) Additional codes must be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. "Configuration Manual", GA27-2876 will aid in assigning the port positions.

LOOP	
FAC No.	FAC Code Description
FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two-lobe at 38,400 bps
FAC 10	Loop, single-lobe at 9600 bps
FAC 11	Loop, two-lobes at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Limitations: Not available with FAC 09. Prerequisites: #1602 and #4830. Maximum: One per 8130. Maximum is one per 8130/8101. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	#9081	#9082	#9083
Selection	Port 4	Port 5	Port 6
Port	#9084	#9085	#9086

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: Not available with FAC 08. Available for ports 4, 5 or 6 only. Prerequisites: #1602, #4830 and #4835. Maximum: One per 8130/8101. Maximum is one per 8130/8101. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	N/A	N/A	N/A
Selection	Port 4	Port 5	Port 6
Port	#9094	#9095	#9096

FAC 10 Loop, Single-Lobe: Required for operating a loop at 9600 bps. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	#9101	#9102	#9103
Selection	Port 4	Port 5	Port 6
Port	#9104	#9105	#9106

FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Limitations: Available for ports 4, 5 or 6 only. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	N/A	N/A	N/A

MACHINES

Selection Port 4 Port 5 Port 6
Port #9114 #9115 #9116

SDLC

FAC No. FAC Code Description

EIA RS232-C/CCITT V.24/V.28,
CCITT X.21bis/V.28

FAC 12 (NO LONGER AVAILABLE)
600 or 1200 bps (External modem)
FAC 13 Up to 9600 bps (External modem)
FAC 15 (NO LONGER AVAILABLE)
600, 1200 or 2400 bps Direct
connect with clock (No modem)
FAC 16 4800 or 9600 bps Direct
connect with clock (No modem)
FAC 17 Direct connect without clock

Integrated Modem

FAC 18 (NO LONGER AVAILABLE)
600 or 1200 bps nonswitched
FAC 19 (NO LONGER AVAILABLE)
600 or 1200 bps switched with
auto answer

CCITT V.35

FAC 24 (NO LONGER AVAILABLE)
Direct connect with clock
(No modem) 600, 1200 or 2400 bps
FAC 25 Direct connect with clock
(No modem) 4800 or 9600 bps
FAC 27 Direct connect without clock
(No modem) 9600 bps

CCITT X.21 Interface

FAC 30 2400, 4800 or 9600 bps
nonswitched
FAC 32 Up to 9600 bps switched

FAC 12 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock - operating with external modem without clocking - and point-to-point switched 2-wire - or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1601 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9121	#9122	#9123
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

Selection	Port 4	Port 5	Port 6
Port	#9124	#9125	#9126
600 bps	#9744	#9745	#9746
1200 bps	#9754	#9755	#9756

FAC 13 EIA RS232/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - with external data communication equipment and clock - point-to-point switched with auto answer to 9600 bps or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection	#9131	#9132	#9133
Port	#9801	#9802	#9803

Selection	Port 4	Port 5	Port 6
Port	#9134	#9135	#9136
LPDA	#9804	#9805	#9806

FAC 15 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Prerequisites: #1601 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9151	#9152	#9153
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753
2400 bps	#9761	#9762	#9763

Selection	Port 4	Port 5	Port 6
Port	#9154	#9155	#9156
600 bps	#9744	#9745	#9746
1200 bps	#9754	#9755	#9756
2400 bps	#9764	#9765	#9766

FAC 16 EIA RS-232-C/CCITT V.24/V.28 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	N/A	N/A	#9163
4800 bps	N/A	N/A	#9773
9600 bps	N/A	N/A	#9783

Selection	Port 4	Port 5	Port 6
Port	#9164	#9165	#9166
4800 bps	#9774	#9775	#9776
9600 bps	#9784	#9785	#9786

FAC 17 EIA RS-232-C/CCITT V.24/V.28 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 40 ft. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9171	#9172	#9173

FAC Specify

Selection	Port 4	Port 5	Port 6
Port	#9174	#9175	#9176

FAC 18 Integrated Modem: (NO LONGER AVAILABLE)

600 or 1200 bps - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Prerequisites: #1601 (NO LONGER AVAILABLE) and #5500 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9181	#9182	#9183

2-wire
600 bps #9851 #9852 #9853
1200 bps #9861 #9862 #9863
4-wire
600 bps #9741 #9742 #9743
1200 bps #9751 #9752 #9753

Selection Port	Port 4	Port 5	Port 6
2-wire			
600 bps	#9184	#9185	#9186
1200 bps			
4-wire			
600 bps	#9854	#9855	#9856
1200 bps	#9864	#9865	#9866
600 bps	#9744	#9745	#9746
1200 bps	#9754	#9755	#9756

(Except Japan) > **FAC 19 Integrated Modem:** (NO LONGER AVAILABLE)

600 or 1200 bps - point-to-point switched with auto answer 2-wire. Prerequisites: #1601 (NO LONGER AVAILABLE) and #5501 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9191 #9192 #9193
600 bps #9741 #9742 #9743
1200 bps #9751 #9752 #9753

Selection Port	Port 4	Port 5	Port 6
600 bps	#9194	#9195	#9196
1200 bps	#9744	#9745	#9746
	#9754	#9755	#9756<

| **FAC 24 CCITT V.35 Interface:** (NO LONGER AVAILABLE)

600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business clock) - and direct connection up to 1,000 ft. Prerequisites: #1601 (NO LONGER AVAILABLE) and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9241 #9242 #9243
600 bps #9741 #9742 #9743
1200 bps #9751 #9752 #9753
2400 bps #9761 #9762 #9763

Selection Port	Port 4	Port 5	Port 6
600 bps	#9244	#9245	#9246
1200 bps	#9744	#9745	#9746
2400 bps	#9754	#9755	#9756
	#9764	#9765	#9766

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business clock) - and direct connection up to 1,000 ft. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port N/A N/A #9253
4800 bps N/A N/A #9773
9600 bps N/A N/A #9783

Selection Port	Port 4	Port 5	Port 6
4800 bps	#9254	#9255	#9256
9600 bps	#9774	#9775	#9776
	#9784	#9785	#9786

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9271 #9272 #9273

Selection Port	Port 4	Port 5	Port 6
600 bps	#9274	#9275	#9276

FAC 30 CCITT X.21 Interface: Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9301 #9302 #9303

Selection Port	Port 4	Port 5	Port 6
600 bps	#9304	#9305	#9306

FAC 32 CCITT X.21 Interface: Up to 9600 bps without business machine clock and switched with auto answer and auto call. Prerequisites: #1602 and #5656. Specify: From the table below specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9321 #9322 #9323

Selection Port	Port 4	Port 5	Port 6
600 bps	#9324	#9325	#9326

BSC

FAC No. FAC Code Description

EIA RS-232-C/CCITT
V.24/V.28/CCITT X.21bis/V.28

FAC 40* 600 or 1200 bps (External modem)
FAC 41* Up to 9600 bps (External modem)
FAC 44* 2400, 4800 or 9600 bps direct connect with clock (No modem)

Integrated Modem

FAC 45* 600 or 1200 bps nonswitched

| **FAC 40 EIA RS-232-C/CCITT V.24/V.28 Interface:** (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock - operating with external modem with no clock - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Mutually exclusive with 8101 A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9401 #9402 #9403
600 bps #9741 #9742 #9743
1200 bps #9751 #9752 #9753

Selection	Port 4	Port 5	Port 6
Port	#9404	#9405	#9406
600 bps	#9744	#9745	#9746
1200 bps	#9754	#9755	#9756

FAC 41 EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface:
(NO LONGER AVAILABLE)

Up to 9600 bps without business machine clock - operating with external data communication equipment - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Mutually exclusive with 8101 A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9411	#9412	#9413

Selection	Port 4	Port 5	Port 6
Port	#9414	#9415	#9416

FAC 44 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

2400, 4800 or 9600 bps with business machine clock - operating with no modem (attached downstream terminal must not provide business machine clock) - and direct connection to 40 ft. Limitations: Mutually exclusive with 8101 A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE), #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	N/A	N/A	#9443
2400 bps	N/A	N/A	#9763
4800 bps	N/A	N/A	#9773
9600 bps	N/A	N/A	#9783

Selection	Port 4	Port 5	Port 6
Port	#9444	#9445	#9446
2400 bps	#9764	#9765	#9766
4800 bps	#9774	#9775	#9776
9600 bps	#9784	#9785	#9786

FAC 45 Integrated Modem: (NO LONGER AVAILABLE)

600 or 1200 bps - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Mutually exclusive with 8101 A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #5500 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9451	#9452	#9453
2-wire			
600 bps	#9851	#9852	#9853
1200 bps	#9861	#9862	#9863
4-wire			
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

Selection	Port 4	Port 5	Port 6
Port	#9454	#9455	#9456
2-wire			
600 bps	#9854	#9855	#9856
1200 bps	#9864	#9865	#9866
4-wire			
600 bps	#9744	#9745	#9746
1200 bps	#9754	#9755	#9756

Start/Stop

FAC No. FAC Code Description
EIA RS-232-C/CCITT V.24/V.28

FAC 60 (NO LONGER AVAILABLE)
110, 134.5, 150 or 300 bps
(External modem)

FAC 61 (NO LONGER AVAILABLE)
110, 134.5, 150 or 300 bps
Direct connect with clock
(No modem)

FAC 60 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

110, 134.5, 150 or 300 bps with business machine clock - operating with external modem - and point-to-point nonswitched facilities will be provided under provisions of the IBM Multiple Supplier Systems Policy. See M2700 pages for specific information on communication facilities and other attachment information. Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9601	#9602	#9603
110 bps	#9701	#9702	#9703
134.5 bps	#9711	#9712	#9713
150 bps	#9721	#9722	#9723
300 bps	#9731	#9732	#9733

Selection	Port 4	Port 5	Port 6
Port	#9604	#9605	#9606
110 bps	#9704	#9705	#9706
134.5 bps	#9714	#9715	#9716
150 bps	#9724	#9725	#9726
300 bps	#9734	#9735	#9736

FAC 61 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

110, 134.5, 150 or 300 bps with business machine clock - operating with no modem (the attached terminal must provide its own business machine clock) - and direct connect up to 40 ft. Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9611	#9612	#9613
110 bps	#9701	#9702	#9703
134.5 bps	#9711	#9712	#9713
150 bps	#9721	#9722	#9723
300 bps	#9731	#9732	#9733

Selection	Port 4	Port 5	Port 6
Port	#9614	#9615	#9616
110 bps	#9704	#9705	#9706
134.5 bps	#9714	#9715	#9716
150 bps	#9724	#9725	#9726
300 bps	#9734	#9735	#9736

DEVICE ATTACHMENT

Direct-Attached Devices: Devices that can attach directly to the processor are: 8101, 8102 Storage and I/O Unit and 8809 Magnetic Tape Unit.

Loop-Attached Devices: The following devices can attach to a direct-attached loop or to a data link-attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

Device and Mdl	Loop Attachment		
 Direct At 9600 bps 38400 bps	Data Link At 2400, 4800,9600 bps
3104 Display Terminal B1,B2	X	X	X
3230 Printer 1	X	X	X
3232 Keyboard Printer			
Terminal mdl 11	X	X	X
3262 Printer 2,12	(1)	X	(1)
3268 Printer 1	X	X	X
3274 Control Unit 51C,61C with:	X	X	X
- 3178 Display Station			
- 3179 Color Display Sta mdl 1			
- 3179 Color Graphics Display mdl G1, G2			
- 3180 Display Station 1			
(available only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 3,13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4,5			
- 3279 Color Display Unit			
- 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3274 Control Unit 52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station 1			
(avail. only when emulating a 3278)			
- 3268 Printer 2			
- 3278 Display Station 1,2,52			
- 3283 Printer 52			
- 3287 Printer 1,2			
3276 Control Unit Display			
Station 11,12,13,14 with:	X		X
- 3178 Display Station			
- 3179 Color Display Station			
- 3180 Display Station 1			
(avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4			
- 3279 Color Display 2A, 2B, 3A, 3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3287 Printer 11,12	X		X
3289 Printer 3 with:	(1)	X	(1)
- 2502 Card Reader A1*			
- 3501 Card Reader			
- 3521 Carder Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting Terminal 1,2	X		X
3642 Encoder Printer 1,2	X		X
3643 Keyboard Display 2,3,4	X		X
3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance	X		X
Terminal			
4701 Finance Communication			
Controller mdl 1,2	X	X	X
5210 Printer E01, E02	X		
7426 Terminal Interface Unit 1			
with associated terminals	X	X	X
8775 Display Terminal 1,2	X	X	X

MACHINES

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data see the M2700 pages and appropriate machine pages for additional information. Refer to the "IBM Information System Configurator", GA27-2876, for selection of 8100 FAC codes.

- Devices conforming to TTY 33/35 or equivalent
- 2741 Communication Terminal
- Terminals conforming to 2780/3780 line protocol
- 3101 Display Terminal mdls 10, 12, 13
- 3161 Display Station mdl 11, 12
- 3163 Display Station mdl 11, 12
- 3232 Keyboard Printer Terminal mdl 1
- 3274 Control Unit mdl 51C, 61C with:
 - 3178 Display Station
 - 3179 Color Display Station mdl 1
 - 3179 Color Graphics Display Station mdls G1, G2
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3230 Printer mdl 2
 - 3262 Printer mdls 3, 13
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 3, 4, 5
 - 3279 Color Display Station mdls 2A, 2B, 3A, 3B
 - 3287 Printer mdls 1, 2, 1C, 2C
 - 3289 Line Printer mdls 1, 2
- 3274 Control Unit mdl 52C with:
 - 3178 Display Station
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 52
 - 3283 Printer mdl 52
 - 3287 Printer mdls 1, 2
- 3276 Control Unit Display Station mdls 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: (*These mdls are supported in SDLC mode.)
 - 3178 Display Station
 - 3179 Color Display Station (not supported on 3276 mdl 1)
 - 3180 Display Station mdl 1 (available only when emulating a 3278)

- 3230 Printer mdl 2
- 3262 Printer mdl 13
- 3268 Printer 2
- 3278 Display Station mdls 1, 2, 3, 4 (See M3276 for configuration details.)
- 3279 Color Display Station mdls 2A, 2B, 3A, 3B (Not supported on 3276 mdls 1, 2, 3, 4)
- 3287 Printer mdls 1, 2, 1C, 2C
- 3289 Line Printer mdls 1, 2

- 3600 Finance Communication Controllers
- 3630 Plant Communication Controllers
- 3651 Store Controllers mdls 25, 75
- 3684 Point of Sale Control Unit mdls 1, 2
- 3767 Communication Terminal mdls 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit
- 4701 Finance Communication Controller
- 4952, 4954, 4955, 4959 Processor (Series/1)
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6360, 6580 Displaywriter (3279 DSC Mode only)
- 6670 Information Distributor mdls 1, 2
- 7426 Terminal Interface Unit mdl 2, with associated terminals
- 8101 Storage and I/O Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 8775 Display Terminal mdls 11, 12

Direct Connection Attachment: In addition to terminal attachment to 8100 System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The direct connect is made by using the SDLC (FAC 15*, 16, 17, 24*, 25, or 27), BSC (FAC 44*) and Start/Stop (FAC 61*).

* NO LONGER AVAILABLE Shown below are the direct connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct connect cables.

Attaching Device	Speeds bps	Attaching Device Feature Number	8100 FAC Code
2741	134.5	#9114** and #3255**	61**
Devices Conforming to 2780/3780 Line Protocol	2400, 4800, 9600	Refer to specific device	44**
3232-1	1200, 2400, 4800, 9600	None None	15** 16
3101, 3161, 3163	110, 150, 300	None required	61**

MACHINES

3274-51C, 61C	1200,2400 4800,9600 1200,2400 4800,9600	#3701 and #6302** #3701 and #6302** #1550 and #6302** #1550 and #6302**	15** 16 24** 25
3276	600,1200,2400 4800,9600	#3701 w #9491** and #6302** #3701 w #9491** and #6302**	15** 16
3651-25/75	4800	#2827**	16*
3705-II	600,1200,2400 4800,9600	#4714** #4714**	15** 16
3705-80	600,1200,2400 4800, 9600	None None	15** 16
3725	600,1200,2400 4800,9600	#4911** #4911**	15** 16
3767	600,1200,2400	#3718 w #9707** and #9533**	15**
4701	1200,2400 4800,9600	None None	15** 16
4952, 4954 4955, 4959	1200, 2400 4800, 9600	#2090** #2090**	15** 16
6360	1200, 2400 4800, 9600	#3707** #3707**	15** 16
6580-A04, B04	1200, 2400 4800, 9600	#3705** #3705**	15** 16
6670-1, 2	600,1200,2400 4800	#9420** #9420**	15** 16
6670-2	9600	#9420**	16
7426-2	600,1200,2400 4800,9600	None None	15** 16
8101,8130, 8140,AXX, BXX	600,1200,2400 600,1200,2400 4800,9600 4800,9600	FAC 17 (See Note) FAC 27 (See Note) FAC 17 (See Note) FAC 27 (See Note)	15** 24** 16 25
8140 CXX	4800	#1621 and #9688** (See Note)	16
8150	4800,9600	#1733 and #9688** or #1734 and #9698** (See Note)	16
8775	600,1200,2400 4800,9600 600,1200,2400 4800,9600	#3701 #3701 #1550 #1550	15** 16 24** 25

Note: FAC 17 or 27 in the attaching 8101, 8130, 8140 AXX, BXX, #1621 and 8140 mdl C, or #1733** or #1734** on 8150 without business machine clock.

* Specify code #9770 is available to facilitate problem determination.

** NO LONGER AVAILABLE

SELECTED CONFIGURATION CODES

Table 1

Selected
Configuration

Feature
Code

Quantity-Component Feature Code

#1001	2-#1602, 1-#3701, 1-#4830, 1-#9081, 1-#9133
#1002	3-#1602, 1-#3701, 2-#4830, 1-#9081, 1-#9102, 1-#9133
#1004	3-#1602, 2-#3701, 1-#4830, 1-#9081, 1-#9133, 1-#9134
#1005	4-#1602, 2-#3701, 2-#4830, 1-#9081, 1-#9102, 1-#9133, 1-#9134
#1007	1-#1602, 1-#3701, 1-#4830, 1-#9102, 1-#9133
#1008	3-#1602, 1-#3701, 2-#4830,

MACHINES

#1009 1-#9101, 1-#9102, 1-#9133
3-#1602, 2-#3701, 1-#4830,
1-#9102, 1-#9133, 1-#9134
#1010 4-#1602, 3-#3701, 1-#4830,
1-#9102, 1-#9133, 1-#9134,
1-#9135

Note: Only the appropriate codes listed below may be specified in addition to the Selected Configuration code.

- Programming Configuration: #9700, #9710, #9720, #9730.
- 3640 Attachment: #9800.
- Storage Size: #9961, #9962, #9963.

- Power Plug/Cable: #9890, #9891, #9986
- Refer to "Specify" for voltage and machine nomenclature.
- Optional Feature Code:
 - #6555 - Keylock, Security Cover (NO LONGER AVAILABLE)
 - #1530 - Tape or 8101 Attachment
 - #1710 (NO LONGER AVAILABLE), #1720 - Processor Storage
 - #4655 - Keylock, Operator
 - #6566 (NO LONGER AVAILABLE) Security Lock, Diskette.

8130 PROCESSOR MODELS B23, B24

PURPOSE

The 8130 Processors provide control, storage, processing capability, disk and diskette storage, and device communication attachment capabilities for the 8100 Information System.

MODELS B23, B24

The following models of the 8130 are available, depending on non-removable disk storage size and fixed head capability. All models include 1 million bytes of removable diskette storage and one million bytes of processor storage.

Mdl	Base Processor Storage (Bytes)	Non Removable Disk Capacity (Mill. Bytes)	Fixed Head Capacity (Bytes)
B23	1,024K (1,048,576)	64MB (64,520,192)	None
B24	1,024K (1,048,576)	58MB (58,654,720)	131,072

Maximum: One per 8100 System.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8130 B23 and B24 are additions to the 8130 family of processors and offer up to 50% more performance than previous 8130 models, greater real and logical storage, capacity for more high speed communication ports and support attachment of 32XX and 37XX Printers and Displays without the requirement for an 8101 or 8102.

The 8130 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8130 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions and up to eight I/O hardware interrupt levels provide for interrupt processing. The 8130 B23 and B24 provide 1,024K (1,048,576) bytes of processor storage that can be expanded to a maximum of 2,096K (2,097,152) bytes with additional features, and provide for dynamic addressing and storage protection for up to 8 million bytes of logical storage. The 8130 Models B23 and B24 storage makes use of error correction codes (ECC) to provide single error correction and double error detection capability.

The 8130 includes system expansion to provide for the attachment of up to three 8101 or 8102 Storage and I/O Units or two 8101 or 8102 Storage and I/O Units and one 8809 Magnetic Tape Unit mdl 1B. An alternate configuration can consist of an 8130, three 8101 or 8102 Storage and I/O units, and one 8809 magnetic tape unit Model 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit Model 1A or 1B.

The 8130 Processors are provided with fixed high speed direct access storage. Depending on the 8130 mdl selected, disk storage of up to 64 million bytes with movable heads or up to 58 million bytes of disk storage with movable and fixed heads is available. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds. Removable diskette storage is provided with up to 1MB (985,088) of storage operating at up to 62K bytes per second. The diskette drive can read/write in basic data exchange format on either the diskette 2D or the diskette Type 1.

The 8130 can attach to any S/370, 30XX or 4341 processor via the 3704/3705 for SNA/SDLC. The 8130 can attach to the ICA of the 115, 125, 135, or 138 Processors for BSC line control. The 8130 can attach to the Communications Adapter of the 4331 Processor for BSC and/or SDLC line control. For specific attachment, see M2700 pages.

The capability of the 8130 is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8130 via loops that are direct attached or data link attached. The 8130 provides for the attachment of six optional communication port features. (Only five if Display and Printer Attachment, #3220 (NO LONGER AVAILABLE), is selected.) On the 8130, the 8101 or 8102 Storage and I/O Unit and the 8809-1B Magnetic Tape Unit can attach directly to the processor via the System Expansion Feature (#1530). With an 8101 Storage and I/O Unit attached the communication ports physically attached can be increased by eight, providing a maximum of fourteen communication ports.

8130 B23 and B24 support up to two high speed (over 9600 baud) communications port features which must reside in the 8130, none in the attached 8101s. When converting from a mdl AX to a mdl BXX, any high-speed adapter(s) in the 8101(s) must be removed.

Physical security is provided through the use of key locks on the operator panel, diskette drive, and machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Designated Customer Setup: The 8130 Processor is designated as a customer setup unit thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8130. Setup procedures for the customer will be shipped with each machine. An 8130 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given. See "IBM 8100 Information System, Site Planning Guide", GA27-2884, for information necessary to plan the site and aid set-up personnel. IBM Marketing is to advise the customer of his responsibilities regarding CSU and relocation.

Publications: GC20-8100.

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture.

- Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
220V #2803	
240V #2831	

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local customer engineering representative.

(Canada only> Canada will use the same power cord and plugs as in the US. Specify #9891 for nonlocking or #9890 for locking plug.<)

(Japan only> Specify #9890 for locking plug or #9891 for nonlocking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a Country RPQ is initiated.<)

Note: (Except Canada and Japan> The three digit Country Code on the DP machine order sheet will be used to select a power plug which matches the most commonly used power supply in the Country.<)

- Color: Pebble gray is the only color available.
- Machine Nomenclature:

Brazilian #2933 English #2924
Canadian Fr #2935 Spanish #2931

- Relocation: A user relocating, removing and/or interchanging an attaching 8101 or 8102 from one 8100 system to another, must consider address compatibility of the processor and its attachments. For further information see "IBM 8100 Information System Site Planning and Preparation Guide", GA27-2884. For relocation/replace kit ordering, see Relocate/Replace 8100 System under the 8130 B2X "Accessories".
- Cabling: For loop information see the 8130 A1XX Accessories and the "IBM Multiuse Communication Loop-Planning Guide", GA23-0038. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884.
- Programming Configuration: Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processor Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations.
- 8101/8102 Attachment: Order #9939 for the first 8102 being attached to any model 8130 or 8140 processor. If the 8102 has feature #4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and secondary processors. This specify code supplies updated maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.
- 8130 B23 and B24 support up to two high speed (over 9600 baud) communications port features which must reside in the 8130, none in the attached 8101s. When converting from a mdl AXX to a mdl BXX, any high-speed adapter(s) in the 8101(s) must be removed.

Field Installation: Yes.

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, communication facility, the operating system installed and the application work load. The maximum number of communication facilities which can be physically attached can exceed operational capability. Increased processor utilization will result from sustained operation of BSC #1603 (NO LONGER AVAILABLE) and #1604 (NO LONGER AVAILABLE) at the maximum aggregate data rate and may cause degradation of activity operating at lower priority levels. Analysis should be performed to determine the impact. Note: Use of BSC 8101 A2X #1605 (NO LONGER AVAILABLE) instead of #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System Publications are dependent on the presence of functional

support modules provided by DPPX, DPCX. Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the "SIPO Functional Definition Manual 8100" which will be available from Mechanicsburg at first customer ship.

Industrial Automation Systems: Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

I Display and Printer Additional (#1506): (NO LONGER AVAILABLE)

Provides for the attachment of additional 3277 Displays, 3732 Text Displays, and 3284, 3286 or 3287, 3288 and 3736 Printers up to a maximum of four. Limitations: See #3220 (NO LONGER AVAILABLE). Field Installation: Yes. Maximum: Five. Prerequisites: #3220 (NO LONGER AVAILABLE).

System Expansion (#1530): Provides programmable hardware interrupt levels and interrupt ID determination. Required for attachment of up to three 8101 or 8102 Storage and I/O units or two 8101 or 8102 units and one 8809-1B magnetic tape unit directly to the 8130. Field Installation: Yes. Maximum: One per 8130.

Processor Storage (#1730): Provides 512K (524,288) bytes of additional processor storage. For 1536K byte configuration specify #9962, for 2048K byte configuration specify #9963. Maximum: Two per 8130. Field Installation: Yes.

Display and Printer Attachment (#3220): Provides attachment capability in any combination up to a maximum of four of the following devices:

- 3277 Display Station, Models 1,2
- 3732 Text Display Station
- 3287 Printer, Models 1,2
- 3284, 3286, 3288, and 3736 Printers

Limitations: Not available with Port 6, FAC 9XX6. Maximum: One per 8130 system. Field Installation: Yes.

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	System* Maximum	System Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.



COMMUNICATIONS AND LOOPS

CCITT V.35 Interface (#1550): Provides interface to external modems/data communication equipment to 56,000 bps or Direct Connection at speeds up to 9600 bps and at 56,000 bps. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC code 31 or FAC 33 or two FAC codes 08, 09. See Table 2 in M8101-A1 and 8101-A2 pages for system maximums. Maximum: For speeds up to 9600 bps, one per selected Communication feature (#1602). For operation at speeds greater than 9600 bps, one in 8130, none in 8101. Field Installation: Yes. Prerequisites: #1602 or #1602 and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21(Except Canada >, CCITT X.21 bis/V.28 <)Interface, CCITT V.24/V.35 Interface and Loop Adapter. Limitations: In an 8100 System only 8 SDLC or Loop communication ports may be active at one time if the 1602 operates at greater than 9600 bps. Maximum: Six. The maximum is reduced by one for each communication feature #1602, #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE). An additional eight ports can be added if an 8101 is attached. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC/SS Communications with Business Machine Clock (#1603):
(NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 interface, or direct connection. In an 8100 System the maximum aggregate BSC data rate is 9600 bps and 330 bps for Start/Stop. Maximum: Six. The maximum is reduced by one for each communication feature, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE). An additional eight ports can be added if an 8101 is attached. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communications Capabilities" section. Note: Mutually exclusive with 8101 A2X FAC codes 42 (NO LONGER AVAILABLE) or 43 (NO LONGER AVAILABLE). BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE).

BSC Communications without Business Machine Clock (#1604):
(NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 interface and direct connect. Limitations: In an 8100 System the maximum aggregate BSC data rate is 9600 bps. Maximum: Six. The maximum is reduced by one for each communication feature, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE). An additional eight ports can be added if an 8101 is attached. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communications Capabilities" section. Note: Mutually exclusive with 8101 A2X FAC codes 42 (NO LONGER AVAILABLE) or 43 (NO LONGER AVAILABLE). BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE).

EIA RS-232-C/CCITT V.24/V.28 CCITT X.21bis/V.28 Interface (#3701): Provides CCITT interface and cable for attachment of an external IBM modem or PTT mandatory modem complying with CCITT Recommendations (1976) V.24, V.28, ISO Standard 2110 and other relevant non-IBM modems may be attached subject to the Multiple System Supplier Bulletin. Maximum: One per selected Communication feature. Field Installation: Yes. Prerequisites: #1602, #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE), #1602 and #5200, #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) and #5200 Specify: Code as provided in FAC description in the "Communication Capabilities" section. See IBM

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 bps or 38,400 bps. Maximum: Six. An additional eight loops can be added if an 8101 is attached. If the features operate at 38,400 bps they must be in the 8130. The maximum is reduced by one for each communication feature. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Limitations: Available in ports four through six only. Maximum: Three. An additional two lobes can be added if an 8101 is attached. Field Installation: Yes. Prerequisites: #4830.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400 (FAC 44 only - NO LONGER AVAILABLE), 4800 bps and 9600, or 56,000 bps for direct connection. Limitations: Available for port position three through six only. Maximum: One. Maximum is three per 8130/8101 System. Field Installation: Yes. Prerequisites: #1602 or #1604 (NO LONGER AVAILABLE)

(Except Canada > X.21 Adapter for Nonswitched Networks (#5655): Provides interface for attachment to X.21 data communication equipment nonswitched at speeds up to 48,000 bps in point-to-point or multipoint configurations. Maximum: One per selected Communications Feature (#1602). One in 8130 only if operating above 9600 bps. Limitations: Operation at 48,000 bps is mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09. See Table 2 in M8101-A1 and 8101-A2 pages for systems maximums. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

X.21 Adapter for Switched Networks (#5656): Provides interface for attachment via Data Circuit-terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287, switched at speeds up to 48,000 bps. Maximum: One per selected communications feature #1602. One in 8130 only if operating above 9600 bps. Limitations: Operation at greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 29, 31 or two FAC codes 08, 09. See Table 2 in M8101-A1 and 8101-A2 pages for systems maximums. One per #1602. For operation at greater than 9600 bps, only one in 8130, none in 8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC description in the "Communication Capabilities" section.<.)

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

The following changes can be field installed. Adequate provisions must be made for retaining data contained on disk storage unit and elimination of user proprietary information.

From	To	B23	B24
A23		X	
A24			X
B23			X

ACCESSORIES

CABLES - LOOP

Loop Cables can be purchased from IBM or a customer selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.
- Other loop cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
- Indoor Cable P/N 1657265: UL approved (style 2919) for interconnection of low voltage electronic equipment. Maximum

allowable cable temperature range is -34 deg C to +80 deg C.

- Indoor Cable P/N 7838694: UL approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34 deg C to +90 deg C.
- Indoor Cable P/N 7838695: UL approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34 deg C to +105 deg C.
- Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34 deg C to +80 deg C.
- Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34 deg C to +80 deg C.

Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft).

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8M (1,000 ft).

Exterior cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3000 ft), by specifying the length wanted. Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.
- Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multiuse Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, and for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

2 x 4 ADAPTER PLATE (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called radials. The point where a radial line terminates at the LWC is called an LWC port. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer supplied volt-ohmm, capable of reading 0.5 ohms and rated at least 5000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohmm to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

System Loop Accessories:

- Order via MES from Raleigh:
- 1657300, Loop Splice Plate (LSP) (indoor)
- 1657310, Loop Station Connector (Radial LSC)
- 1657320, Loop Station Connector (Wrap LSC)
- 1657260, Loop Station Connector Gasket
- 1657330, Loop Wiring Concentrator (LWC)
- 1657332, LWC Circuit Board Assy (order instead of LWC-1657330)*
- 1657350, Loop Surge Suppressor (LSS)
- 1657354, LSS Circuit Board Assy (order instead of LSS-1657350)*
- 1657420, Continuity and Relay Tester
- 1657325, Wrap Switch Access Cover
- 1657379, Loop Accessory Keys (10 spares)**
- 7838771, 2 x 4 Adapter Plate (2AP)

Order via MES from Fujisawa:

- 2102151, Conventional Box (indoor) 5 x 10cm - (2 x 4 inches)
- 2100264, Clamp (for cable to indoor box)
- 1657280, Environmental Box (outdoor) 7x11.5cm - (2.75x4.5 inches) (For industrial use)
- 2114285, Environmental Clamp - small (for indoor cable to environmental box)
- 1657377, Environmental Clamp - large (for outdoor cable to environmental box)
- 1657292, Metric conduit adapter
- 1657305, Environmental Enclosure - NEMA - 4X 36x30x15cm (14x12x6 in.)
- 1657306, Environmental Enclosure Mtg Pnl
- 1657307, Sealing - Locknut

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** One package (10 keys) shipped with each 8101 or 8130. One key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use Machine type 8101 or 8130.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments. However, see local CE management and GI section 65 for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuse Communications Loop Planning and Installation Guide", (GA27-3341) for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the Branch Office.

To enable a customer to test his installed loops it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

(Except Canada and Japan > Relocate/Replace Kits: The material required to perform machine relocation or processor replacement has been grouped into machine type dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8130 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8101,8102	4448550	4448551	N/A
8101,8102 (w/FC4525)	6226687	6226686	N/A
8130	4448552	4448553	N/A

For 8100 Information Systems without 8101 or 8102 storage and I/O units attached:

- Use Figure 2 below to order appropriate kit B/M.
- Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
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8130 Processor

8130	4448575	4448576	N/A
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Kits For Systems With 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8101,8102	6226492	6226496	N/A
8101, 8102 (w/FC4525)	6423302	6423301	N/A
8130	6226493	6226497	N/A

Kits For Systems Without 8101
or 8102 Attached - Spanish

8130	6226500	6226503	N/A
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Kits For Systems With 8101 or
8102 Attached - French Canadian

8101,8102	6226590	6226594	N/A
8101,8102 (w/FC4525)	6423304	6423303	N/A
8130	6226591	6226595	N/A

Kits For Systems Without 8101 or
8102 Attached - French Canadian

8130	6226598	6226601	N/A
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Kits For Systems With 8101 or
8102 Attached - Japanese

8101,8102	6423295	6423296	N/A
8101,8102 w/FC4525	6423297	6423298	N/A
8130	6423279	6423280	N/A

Kits For Systems Without 8101
or 8102 Attached - Japanese

8130	6423281	6423282	N/A
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- Check for missing/damaged wrap plugs. If required, see the wrap plug entry in this section of the Sales Manual.
- Ordering Information: (Canada only > Order via MSORDER (category = supplies/ accessories Group Code = DP Supply Order) <) (Except Canada and Japan > Order via MES from Raleigh; <) (Japan only > Order via MES from Fujisawa. <)

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3.

Figure 3

	Comm	Wrap
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MACHINES

Communication Feature	Cable Grp No.	Plug P/N
Loop Station Adapter (Single Lobe)	3709	7389282
DDSA	3717	6835350
V.35 Modem	3718	6835348
V.35 Direct Connect	3719	6835349
V.35 Direct Connect PT TO PT	3720	6835642
EIA Direct Connect	3721	6835642
EIA Modem	3724	6835346
Loop Station Adapter (Double Lobe)	3726	7389282
EIA Direct Connect PT TO PT	3727	6835347
X.21	3728	6835379

Ordering Information: Via Branch Office, Code 'S' from Mechanicsburg

SUPPLIES (NONE)

COMMUNICATION CAPABILITIES

There are a variety of Communication Capabilities (see M2700 pages) supported by the 8130 Features for Attaching Communications (FAC) differing in speed, protocol and attachment interfaces. These FAC codes have been categorized as LOOP, SDLC, BSC, and START/STOP. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation FAC No.) for additional details. Reference to switched communications in the FAC codes, refers to the communication link between the 8100 System and the S/370 or 4300 Processor.

The 8130 special features allow a maximum of six communication capabilities to be configured and designated as communication ports but only five if Display and Printer Attachment, #3220 (NO LONGER AVAILABLE) is selected. Each communication port position (1 through 6) must consist of a communications feature for SDLC, BSC or Start/Stop

The SDLC communications feature is available without business machine clock (#1602). The BSC/SS communications feature, #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE), is available with business machine clock and without business machine clock. If the 8130 is to provide the attached facility with business machine clock at speeds of 2400 bps or greater, the multi-speed clock feature (#5200) is required. One Multi-Speed Clock feature (#5200) can provide business machine clocking to any or all of port position three through six.

In addition to selecting a Communications feature #1602, 1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) for each port configured in an 8130, a communication interface must be selected to support the Communication Facility attaching to that port. A two lobe loop port requires three special features (#1602, #4830 and #4835). Direct connect at 2400, 4800, 9600 or 56,000 bps requires the Multi-Speed clock (#5200). Each port of the 8130 also requires the selection of a specify code to indicate the 8100 System FAC Code selected for that port. Certain 8100 System FAC Codes will require a second specify code to select options available within that facility: Line speed/LPDA.

8130 B23 and B24 support up to two high speed (over 9600 baud) communications port features which must reside in the 8130, none in the attached 8101s. When converting from a mdl AXX to a mdl BXX, any high-speed adapter(s) in the 8101(s) must be removed.

Note: Within a given FAC, the selected option (line speed/LPDA) can be changed in the field by Customer Engineering. All such changes are chargeable at the applicable CE rate. Do not submit

an MES. However, the MES for removal of a FAC and its associated feature and specify codes must identify the original codes ordered from the factory. Port 6 is not available if Display and Printer Attachment (3200) is selected.

Specify and FAC Code Descriptions: A specify code number is required to identify the selected FAC code and its physical port position. The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9, e.g.:

#9ABC where AB = FAC No., and C = Port Position.

FAC codes range in number from 08 to 61* resulting in FAC specify codes ranging in number from #9084 to #9616. (Some FAC codes are NO LONGER AVAILABLE. See FAC code description for availability.) Additional codes must be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. "Configuration Manual", GA27-2876 will aid in assigning the port positions. FACs 9XX6 are not available if Display and Printer Attachment, #3220 (NO LONGER AVAILABLE) is selected, as denoted by *.

LOOP

FAC No.	FAC Code Description
FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two lobe at 38,400 bps
FAC 10	Loop, single lobe at 9600 bps
FAC 11	Loop, two lobes at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Limitations: Available in ports 4 and 5 only. Prerequisites: #1602 and #4830. Maximum: Two per 8130. None in an 8101. The maximum is reduced by one for each FAC 09, 26, 28, 29, 31 or 33. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify Selection Port	Port 1 N/A	Port 2 N/A	Port 3 N/A
Selection Port	Port 4 #9084	Port 5 #9085	Port 6 N/A

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: Available in Ports 4 and 5 only. Prerequisites: #1602, #4830 and #4835. Maximum: Two per 8130. None in 8101. Maximum is reduced by one for each FAC 08, 26, 28, 29, 31 or 33. Specify: From the table below, specify the required code to complete the configuration from the port selected.

FAC Specify Selection Port	Port 1 N/A	Port 2 N/A	Port 3 N/A
Selection Port	Port 4 #9094	Port 5 #9095	Port 6 N/A

FAC 10 Loop Single Lobe: Required for operating a loop at 9600 bps. Prerequisites: #1602 and #4830. Specify: From the table below, specify required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 1 #9101	Port 2 #9102	Port 3 #9103
Selection Port	Port 4 #9104	Port 5 #9105	Port 6 #9106

FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Limitations: Available for ports 4, 5 or 6 only. Prerequisite:

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sites: #1602, #4830 and #4835. Maximum: Two per 8130. None in 8101. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	N/A	N/A	N/A

Selection	Port 4	Port 5	Port 6
Port	#9114	#9115	#9116

SDLC
FAC No. FAC Code Description

EIA RS-232-C/CCITT V.14/V.28,
CCITT X.21bis/V.28

FAC 13 Up to 9600 bps (External modem)
FAC 16 4800-9600 with clock (no modems)
FAC 17 Direct-connect without clock

CCITT V.35

FAC 25 Direct-connect with clock
(No modem) 4800 or 9600 bps
FAC 26 Direct-connect with clock
(No modem) 56,000 bps
FAC 27 Direct-connect without clock
(No modem) 9600 bps
FAC 28 Direct-connect without clock
(No modem) 56,000 bps
FAC 29 Up to 56,000 bps nonswitched
bps nonswitched

(Except Canada)
CCITT X.21 Interface

FAC 30 Up to 9600 bps nonswitched
FAC 31 48,000 bps nonswitched
FAC 32 Up to 9600 bps switched
FAC 33 48,000 bps switched<)

FAC 13 EIA RS-232-C/CCITT V.24/V.28 CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock with external data communication equipment and clock point-to-point switched with auto answer to 9600 bps or point-to-point non-switched 2- or 4-wire or multipoint 4-wire. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	#9131	#9132	#9133
LPDA	#9801	#9802	#9803

Selection	Port 4	Port 5	Port 6
Port	#9134	#9135	#9136
LPDA	#9804	#9805	#9806

FAC 16 EIA RS-232-C/CCITT V.24/V.28 Interface: 4800 or 9600 bps with business machine clock operating with no modem (attached machine must not provide business machine clock) and direct connection up to 40 ft. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	N/A	N/A	#9163

4800 bps	N/A	N/A	#9773
9600 bps	N/A	N/A	#9783

Selection	Port 4	Port 5	Port 6
Port	#9164	#9165	#9166
4800 bps	#9774	#9775	#9776
9600 bps	#9784	#9785	#9786

FAC 17 EIA RS-232-C/CCITT V.24/V.28 Interface: Up to 9600 bps without business machine clock operating with other 8100 Systems (with business machine clock) and direct connection up to 40 ft. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	#9171	#9172	#9173

Selection	Port 4	Port 5	Port 6
Port	#9174	#9175	#9176

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock operating with no modem (attached machine must not provide clock) and direct connection up to 1,000 ft. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	N/A	N/A	#9253
4800 bps	N/A	N/A	#9773
9600 bps	N/A	N/A	#9783

Selection	Port 4	Port 5	Port 6
Port	#9254	#9255	#9256
4800 bps	#9774	#9775	#9776
9600 bps	#9784	#9785	#9786

FAC 26 CCITT V.35 Interface: 56,000 bps with business machine clock operating with no modem and direct connection up to 1000 ft. or up to a total cable length of 200 ft. to a 3705. Limitations: Mutually exclusive with FAC codes 28, 29, 31, 33 or two FAC codes 08, 09. Available in Port 3 only. See Table 2 in M8101-A1 and 8101-A2 pages for system maximums. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify required codes to complete the configuration for each port selected. Maximum: One per 8130. None in 8101.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	N/A	N/A	#9263

Selection	Port 4	Port 5	Port 6
Port	N/A	N/A	N/A

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock operating with other 8100 System (with business machine clock) and direct connection up to 1,000 ft. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Port 1	Port 2	Port 3
Selection			
Port	#9271	#9272	#9273

Selection	Port 4	Port 5	Port 6
Port	#9274	#9275	#9276

FAC 28 CCITT V.35 Interface: 56,000 bps without business machine clock operating with no modem and direct connection up to 1,000 ft to another 8100 System (with business machine clock). Limitations: Mutually exclusive with FAC codes 26, 29, 31, 33 or two FAC codes 08, 09. Available in Port 3 only. See Table 2 in M8101-A1 and 8101-A2 pages for system maximums. Maximum: One per 8130. None in 8101. Prerequisites: #1602 and #1550. Specify: From the

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table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port N/A N/A #9283

Selection Port 4 Port 5 Port 6
Port N/A N/A N/A

FAC 29 CCITT V.35 Interface: Up to 56,000 bps without business machine clocks and external data communication equipment with clock, and point-to-point or multipoint nonswitched. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 31, 33 or two FAC codes 08, 09. Available in Port 3 only. See Table 2 in M8101-A1 and 8101-A2 pages for system maximums. Maximum: For operation at speeds greater than 9600 bps, one per 8130. None in 8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port N/A N/A #9293

Selection Port 4 Port 5 Port 6
Port N/A N/A N/A

(Except Canada > **FAC 30 CCITT X.21 Interface:** Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9301 #9302 #9303

Selection Port 4 Port 5 Port 6
Port #9304 #9305 #9306

FAC 31 CCITT X.21 Interface: 48,000 bps without business machine clock and point-to-point or multipoint nonswitched operation. Limitations: Mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09. Available in Port 3 only. See Table 2 in M8101-A1 and 8101-A2 pages for system maximums. Maximum: One per 8130. None in 8101. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port N/A N/A #9313

Selection Port 4 Port 5 Port 6
Port N/A N/A N/A

FAC 32 CCITT X.21 Interface: Up to 9600 bps without business machine clock and switched with auto answer and auto call. Prerequisites: #1602 and #5656. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9321 #9322 #9323

Selection Port 4 Port 5 Port 6
Port #9324 #9325 #9326

FAC 33 CCITT X.21 Interface: Up to 48,000 bps without business machine clock and switched with auto answer and auto call. Limitations: Mutually exclusive with FAC codes 26, 28, 29, 31 or two FAC codes 08, 09. Available in Port 3 only. One per 8130. None in 8101. Prerequisites: #1602 and #5656. Specify: From the table below,

specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port N/A N/A #9333

Selection Port 4 Port 5 Port 6
Port N/A N/A N/A(<)

BSC

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28/CCITT
X.21bis/V.28

FAC 40 (NO LONGER AVAILABLE)
600 or 1200 bps (External modem)
FAC 41 (NO LONGER AVAILABLE)
Up to 9600 bps (External modem)
FAC 44 (NO LONGER AVAILABLE)
2400, 4800 or 9600 bps direct
connect with clock (No modem)

FAC 40 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock operating with external modem with no clock point-to-point nonswitched 2- or 4-wire or multipoint nonswitched 4-wire. Limitations: BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration from each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9401 #9402 #9403
600 bps #9741 #9742 #9743
1200 bps #9751 #9752 #9753

Selection Port 4 Port 5 Port 6
Port #9404 #9405 #9406
600 bps #9744 #9745 #9746
1200 bps #9754 #9755 #9756

FAC 41 EIA RS-232-C/CCITT V.24/V.28 X.21bis/V.28 Interface: (NO LONGER AVAILABLE)

Up to 9600 bps without business clock operating with external data communication equipment and point-to-point nonswitched 2- or 4-wire or multipoint nonswitched 4-wire. Limitations: BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection Port 1 Port 2 Port 3
Port #9411 #9412 #9413

Selection Port 4 Port 5 Port 6
Port #9414 #9415 #9416

FAC 44 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

2400, 4800 or 9600 bps with business clock operating with no modem (attached downstream terminal must not provide business machine clock) and direct connection to 40 ft. Limitations: BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Pre-

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requisites: #1604 (NO LONGER AVAILABLE), #3701 and #5200.
Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	N/A	N/A	#9443
2400 bps	N/A	N/A	#9763
4800 bps	N/A	N/A	#9773
9600bps	N/A	N/A	#9783

FAC Specify			
Selection	Port 4	Port 5	Port 6
Port	#9444	#9445	#9446
2400 bps	#9764	#9765	#9766
4800 bps	#9774	#9775	#9776
9600bps	#9784	#9785	#9786

START/STOP

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28

FAC 60 (NO LONGER AVAILABLE)
110, 134.5 150 or 300 bps
(External modem)

FAC 61 (NO LONGER AVAILABLE) 110,
134.5, 150, or 300 bps direct
connect with clock (No modem)

| **FAC 60 EIA RS-232-C/CCITT V.24/V.28 Interface:** (NO LONGER AVAILABLE)

110, 134.5, 150, 300 bps with business clock operating with external modem and point-to-point nonswitched facilities. See M2700 pages for specific information on communication facilities and other attachment information. Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	#9601	#9602	#9603
110 bps	#9701	#9702	#9703
134.5 bps	#9711	#9712	#9713
150 bps	#9721	#9722	#9723
300 bps	#9731	#9732	#9733

FAC Specify			
Selection	Port 4	Port 5	Port 6
Port	#9604	#9605	#9606
110 bps	#9704	#9705	#9706
134.5 bps	#9714	#9715	#9716

150 bps	#9724	#9725	#9726
300 bps	#9734	#9735	#9736

| **FAC 61 EIA RS-232-C/CCITT V.24/V.28 Interface:** (NO LONGER AVAILABLE)

110, 134.5, 150 or 300 bps with business clock operating with no modem (the attached terminal must provide its own business machine clock) and direct connect up to 40 ft. Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 1	Port 2	Port 3
Port	#9611	#9612	#9613
110 bps	#9701	#9702	#9703
134.5 bps	#9711	#9712	#9713
150 bps	#9721	#9722	#9723
300 bps	#9731	#9732	#9733

FAC Specify			
Selection	Port 4	Port 5	Port 6
Port	#9614	#9615	#9616
110 bps	#9704	#9705	#9706
134.5 bps	#9714	#9715	#9716
150 bps	#9724	#9725	#9726
300 bps	#9734	#9735	#9736

DEVICE ATTACHMENT

Direct Attached Devices: Devices that can attach directly to the 8130-B processor are:

3277 Display Station mdls 1,2--Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
3284 Printer mdls 1,2--Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
3286 Printer mdls 1,2--(Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
3287 Printer mdls 1,2--(Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
3288 Line Printer mdl 2--(Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
3732 Text Display Station--(Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
3736 Printer--(Via #3220 (NO LONGER AVAILABLE)-- #1506 (NO LONGER AVAILABLE)
8101, 8102 Storage and I/O Unit
8809 Magnetic Tape Unit 1B

Loop Attached Devices: The following devices can attach to a direct attached loop or to a data link attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

LOOP ATTACHMENT

Device and Mdl

3104 Display
Terminal B1,B2
3262 Printer 2,12
3268 Printer 1
3274 Control Unit
mdls 41C, 51C, 61C with:
- 3178 Display Station
- 3262 Printer 3, 13
- 3268 Printer 2
- 3278 Display Station 1, 2, 3, 4, 5
- 3278 PC Attachment

Direct At		Data Link
9600 bps	38400 bps	At 2400, 4800,9600 bps

X	X	X
(1)	X	(1)
X	X	X
X	X	X

- 3279 Color Display Unit 2A, 2B, 3A, 3B			
- 3287 Printer 1, 2, 1C, 2C			
- 3289 Printer 1, 2			
- 3290 Information Panel			
3274 Control Unit 52C with:	X	X	X
- 3268 Printer 2			
- 3278 Display Station 1, 2, 52			
- 3283 Printer 52			
- 3287 Printer 1, 2			
3276 Control Unit Display Station 11,12,13,14 with:	X		X
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1, 2, 3, 4,			
- 3279 Color Display 2A, 2B, 3A, 3B			
- 3287 Printer 1, 2, 1C, 2C			
- 3289 Printer 1,2			
3287 Printer 11,12	X	X	X
3289 Printer 3 w/	(1)		(1)
- 2502 Card Reader A1*			
- 3501 Card Reader			
- 3521 Carder Punch*			
(*Requires 3782 Attachment Unit)			
3641 Recording Terminal 1,2	X		X
3642 Encoder Printer 1,2	X		X
3643 Keyboard Display 2,3,4	X		X
3644 Auto Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance Terminal			
4701 Finance Communication Controller mdl 1	X	X	X
5210 Printer E01, E02	X		
7426 Terminal Interface Unit	X	X	X
8775 Display Terminal 1,2	X	X	X

Note 1: Dedication of a 9600 bps single lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data, see the M2700 pages and appropriate machine pages or refer to the "IBM World Trade Signal Converter Handbook" for additional information. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of 8100 FAC codes.

- Devices conforming to TTY 33/35 or equivalent
- 2741 Communication Terminal
- Terminals conforming to 2780/3780 line protocol
- 3101 Display Terminal mdls 10, 12, 13
- 3274 Control Unit mdl 41C, 51C, 61C with:

- 3178 Display Station
- 3262 Printer mdls 3, 13
- 3268 Printer 2
- 3278 Display Station mdls 1, 2, 3, 4, 5
- 3278 PC Attachment
- 3279 Color Display Station mdls 2A, 2B, 3A, 3B
- 3279 PC Attachment
- 3287 Printer mdls 1, 2, 1C, 2C
- 3289 Line Printer mdls 1, 2
- 3290 Information Panel

- 3274 Control Unit mdl 52C with:

- 3268 Printer 2
- 3278 Display Station 1, 2, 52
- 3283 Printer mdl 52
- 3287 Printer mdls 1, 2

- 3276 Control Unit Display Station mdls 1*, 2*, 3*, 4*, 11, 12, 13, 14, with: (*These mdls are supported in SDLC mode.)

- 3262 Printer mdl 13
- 3268 Printer 2
- 3278 Display Station mdls 1, 2, 3, 4 (See M3276 for configuration details.)
- 3279 Color Display Station mdls 2A, 2B, 3A, 3B (Not supported on 3276 mdls 1, 2, 3, 4)
- 3287 Printer mdls 1, 2, 1C, 2C
- 3289 Line Printer mdls 1, 2

- 3601 Finance Communication Controllers mdls 1, 2A, 2B, 3A, 3B
- 3602 Finance Communication Controllers mdls 1A, 1B
- 3632 Plant Communication Controllers mdls 1A, 1B
- 3651 Store Controllers mdls 25, 75
- 3684 Point of Sale Control Unit mdls 1, 2
- 3767 Communication Terminal mdls 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit
- 4701 Finance Communication Controller mdl 1
- 4952, 4954, 4955, 4959 Processor (Series/1)
- 5150 Personal Computer
- 5285, 5288 Programmable Data Stations
- 6580 Display Writer (DSC mode only)
- 6670 Information Distributor mdls 1, 2
- 7426 Terminal Interface Unit mdl 2 with associated terminals
- 8101 Storage and I/O Unit
- 8130 Processor
- 8140 Processor

MACHINES

- 8150 Processor
- 8775 Display Terminal mdls 11, 12

Direct Connect Attachment: In addition to terminal attachment to 8130B System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The di-

rect connect is made by using the feature numbers and FAC codes as shown below. Shown below are the direct connect attachable devices and required device feature numbers. The "8100 IBM Information System Site Planning Guide for IBM 8101, 8130, 8140", GA27-2884 will assist in the selection of direct connect cables.

Attaching Device	Speeds bps	Attaching Device Feature Number	8100 FAC Code
2741	134.5	#9114** and #3255**	61**
Devices Conforming to 2780/3780 Line Protocol	2400,4800,9600	Refer to specific device	44**
3232-1	1200,2400,4800,9600	None	16
3101, 3161,3163	110,150,300	None required	61**
3274-41C, 51C, 61C	4800	#3701 and #6302**	16
	9600	#3701 and #6302**	16
	56000	#1550 and #6303**	26
3276	4800,9600	#3701 w #9491** and #6302**	16
3651 *			
25/75	4800	#2827**	16*
3705-II	4800	#4714**	16
	9600	#4714**	16
	56000	#2944**	26
3705-80	4800	None	16
	9600	None	16
	56000	#6712**	26
4701-1	4800,9600	None	16
4952, 4954, 4955,4959	4800,9600	#2090**	16
6360	4800,9600	#3707**	16
6580-A04,-B04	4800,9600	#3705**	16
6670-1,2	4800,9600	#9420**	16
7426-2	4800	None	16
7426-2	9600	None	16
8101, 8130,			
8140, AXX, BXX	4800,9600	FAC17(see Note)	16
8140, CXX	4800	#1621 and #9688** (see Note)	16
8140, CXX	56000	#1614 and #9683** (see Note)	26
8150	4800,9600	#1733** and #9688** or #1734** and #9698** (see Note)	16
	56000	#1742** and #9682** or #1745** and #9693** (see Note)	26

MACHINES

8101, 8140, BXX	56000	FAC28(see Note)	26
8775	4800, 9600	#1550	25

Note: FAC 17 or 28 in the attaching 8101, 8130, 8140 A2X, BXX ,
#1621 and 8140 mdl C or 8150 with #1733**, #1734**, #1742**, or
#1745** without business machine clock.

* Specify code #9770 is available to facilitate problem determination.

** NO LONGER AVAILABLE.

8140 PROCESSOR MODELS A31 - A74

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

(NO LONGER AVAILABLE)

PURPOSE

The 8140 Processor provides control, storage, processing capability, disk and diskette storage, and device attachment capabilities for the 8100 Information System.

MODELS A31 - A74

	Base Processor Storage (bytes)	Non-Removable Disk Capacity (mill. bytes)	Fixed Head Capacity (bytes)
Mdl			
A31	256K (262,144)	29MB (29,327,360)	None
A32	256K (262,144)	23MB (23,461,888)	131,072
A33	256K (262,144)	64MB (64,520,192)	None
A34	256K (262,144)	58MB (58,654,720)	131,072
A41	320K (327,680)	29MB (29,327,360)	None**
A42	320K (327,680)	23MB (23,461,888)	131,072**
A43	320K (327,680)	64MB (64,520,192)	None**
A44	320K (327,680)	58MB (58,654,720)	131,072**
A51	512K (524,288)	29MB (29,327,360)	None
A52	512K (524,288)	23MB (23,461,888)	131,072
A53	512K (524,288)	64MB (64,520,192)	None
A54	512K (524,288)	58MB (58,654,720)	131,072
A61	*768K (786,432)	29MB (29,327,360)	None
A62	*768K (786,432)	23MB (23,461,888)	131,072
A63	*768K (786,432)	64MB (64,520,192)	None
A64	*768K (786,432)	58MB (58,654,720)	131,072
A71	*1024K (1,048,576)	29MB (29,327,360)	None
A72	*1024K (1,048,576)	23MB (23,461,888)	131,072
A73	*1024K (1,048,576)	64MB (64,520,192)	None
A74	*1024K (1,048,576)	58MB (58,654,720)	131,072

* Available as Model upgrade only.

** These Models include Floating Point Arithmetic.

Maximum: One per 8100 Information System.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8140 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8140 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions. The 8140 Model A41 through A44 also includes additional instructions for floating point arithmetic. Eight I/O interrupt levels provide for interrupt processing. The 8140 offers various amounts of bytes of processor storage of which 4,096 bytes are read only storage and not available for user programs. Processor storage can be expanded up to a maximum of 384K (393,216) for the Model A31 through A34. Fixed amounts of 320K (327,680) bytes for the Models A41 through A44 and 512K (524,288) bytes for the Models A51 through A54, 768K (786,432) bytes for the Models A61 through A64 and 1024K (1,048,576) bytes for the models A71 through A74. Capability for dynamic addressing and storage protection for up to 4 million bytes of logical storage is also available.

The 8140 allows for the attachment of up to four 8101 or 8102 Storage and I/O Units or three 8101 or 8102 Storage and I/O Units and one 8809 Magnetic Tape Unit Model 1B. An alternate configuration can consist of an 8140, four 8101 or 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit Model 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit Model 1A or 1B.

The 8140 Processor is provided with fixed high-speed direct access storage. Depending on the 8140 Model selected, disk storage of up to 64 million bytes with movable heads or up to 58 million bytes of disk storage with movable and fixed heads is available. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds. Removable diskette storage is available with up to 1MB (985,088 bytes) of storage operating at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370, 4300, or 9370 processors via the 3704, 3705, 3720 or 3725 for SNA/SDLC or BSC line control. The 8100 System attaches to the ICA of the 115, 125, 135, or 138 Processors for BSC line control. The 8100 System can attach to the communications adapter of the 4331, 4361, or 9370 Processor for BSC and/or SDLC line control. For specific attachment see M2700 pages.

The capability of the 8100 Information System is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8140 via communication features which include data link, direct-connect, and loops that are direct-attached or data link-attached. The number of communication ports that can be attached to the 8140 is three for Models A31 through A34 and two for models A41 through A44. The 8140 Models A51 through A74 requires the 8101 Storage and I/O Unit for the attachment of communication ports.

Customer Setup: The 8140 Processor is designated as a customer setup unit thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8140. Setup procedures for the customer will be shipped with each machine. An 8140 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the

cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices.

IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, communication facilities, the operating system installed and the application work load. The maximum number of communications features which can be physically installed can exceed the operational capability. Increased processor utilization will result from sustained operation of BSC #1603 (NO LONGER AVAILABLE) and #1604 (NO LONGER AVAILABLE) at the maximum aggregate data rate and may cause degradation of activity operating at lower priority levels. Analysis should be performed to determine the impact. Features #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System Publications are dependent on the presence of functional support modules provided by DPPX, DPCX. Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the "Functional Definition Manual" 8100 which will be available from Mechanicsburg at FCS.

Selected Configurations: To ease the selection, configuring, ordering and installation of an 8140 Processor, Selected Configurations has been developed. Selected Configurations is designed to be applicable for the majority of customer installations, both DPPX and DPCX are supported. The use of Selected Configurations is recommended. Traditional configuration selection and ordering should be used for configurations not included in the selected configurations. For additional information, see "Selected Configuration Ordering Guide", ZZ20-4598.

The following table lists the appropriate selected configuration codes for each Model and the communication capabilities for each selected configuration.

	CODE
	1 1 1 1 1 1 1 1
	0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 1
	0 2 4 5 7 8 9 0
Description	
8140 Model A4X,	X
A5X, A6X, A7X	
Port 1 Dir-Att Loop	
- 38.4KB	
- 9.6KB	
Port 2 Dir-Att Loop	
9.6KB	
Port 3 Data Link	No Communication
9.6KB	Attachment
Port 4 Data Link	
9.6KB	
Port 5 Data Link	
9.6KB	
Port 6 Dir-Att Loop	
9.6KB	

Notes:

- Magnetic tape attachment to 8140.
 - use 8809 Model 1B.

- Recommended DPPX configurations:
 - No less than 512K processor storage
 - No less than 58MB disk storage
 - Fixed Head feature in processor disk

Selected Configuration Attachment: No communications available. Maximum: One. Field Installation: No. Prerequisites: See Table below.

Table 1
Selected Configuration Codes

Selected Config. F/C	Quantity-Component F/C
#1000	No Communication Facilities

Note: Additional required specified codes.

- Power Plug/Cable: #9890, #9891, #9886.
- 3640 Attachment: #9800.
- Programming Configuration: #9700, #9710, #9720, #9730
- Optional feature codes: #4655-Keylock (NO LONGER AVAILABLE), Operator, #6555-Keylock (NO LONGER AVAILABLE), Security Cover, #6566-Security Lock (NO LONGER AVAILABLE), Diskette, #1490 (NO LONGER AVAILABLE)-Storage Expansion, A3X.

Publications: GC20-8100.

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

- (Canada only > Voltage (120 AC, 1-phase, 3-wire, 60 Hz): Specify #9891 for nonlocking plug, #9890 for locking plug. If 4.3m (14 ft.) power cable is not desired, specify #9886 for 1.8m (6 ft.) cable. <)

- (Except Canada > Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
	220V #2803<)

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

(Japan only > Specify #9890 for locking plug, #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated. <)

Note: (Except Canada and Japan > The 3-digit Country Code on the DPMO will be used to select a power plug which matches the most commonly used power supply in the country. If the most common power supply is not specified, and if it is incompatible with the power plug commonly supplied, a power cord without a plug will be shipped unless a country RPQ is initiated. <)

- Color: Pebble gray is the only color available.
- Machine Nomenclature:

Brazilian (Portuguese) #2933
Canadian French #2935
English US #2924
Spanish #2931

- Relocation: If the user relocates and/or interchanges an attaching 8101 or 8102 from one 8100 System to another, the user must consider address compatibility of the processor and its attachments. For further information, see "IBM 8100 Information System Site Planning Guide", GA27-2884. For relocation/replace kit ordering, see "Relocate/ Replace, 8100 System" under "Accessories".
- Cabling: For loop cabling information, see "Accessories" and the "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter feature.
- Programming Configuration: Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations. Field Installation: Yes.
- 8101/8102 Attachment: Order #9939 for the first 8102 being attached to any Model 8130 or 8140 processor. If the 8102 has feature #4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and secondary processors. This specify code supplies updated maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.
- Industrial Automation Systems specify:
 - Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

NON-COMMUNICATIONS FEATURES

| Storage Increment 128K (#1490): (NO LONGER AVAILABLE)

Provides 131,072 bytes of additional processor storage. The ordering of the additional quantities of this feature will allow the expansion of the 8140 Model A31 through A34 storage up to a maximum 393,216 bytes. Maximum: One for 8140 Models A31 through A34. Field Installation: Yes.

| Expanded Function Operator Panel (#4545): (NO LONGER AVAILABLE)

This feature provides operator access to processor storage, program stop and restart capability and current operating indicators. Limitations: Not available on 8140 Models A41 through A44 with SDLC or BSC/SS Communications (#1602), Loop Adapter (#4830), or the 8140 Models A51 through A74. Maximum: One. Field Installation: Yes. Field Removable: No.

| Keylock (#4655): (NO LONGER AVAILABLE)

This Keylock Feature provides processor security by the selection of three modes of operation: Disable power on and operator panel functions --- Enable power on but disable operator panel --- Enable power on and full operator panel functions. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith. Maximum: One. Field Installation: Yes. Field Removable: No.

| Security Cover Locks (#6555): (NO LONGER AVAILABLE)

This feature provides key-operated security locks for the machine covers, restricting access to the machine interior and external cable connector area. See Security Lock, Diskette (#6566 - NO LONGER AVAILABLE) if diskette security is required. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith. Maximum: One. Field Installation: Yes. Field Removable: No.

| Security Lock, Diskette (#6566): (NO LONGER AVAILABLE)

This feature provides a key operated security lock to restrict access to the diskette magnetic media. It is accessible only by opening the front cover. For maximum system security, the Security Cover Lock (#6555 - NO LONGER AVAILABLE) must be used in addition to the Diskette Security Lock. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith. Maximum: One. Field Installation: Yes. Field Removable: No.

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

Sys Processor	Sys* Max	System Units Which May Have Display Printer Feats
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

COMMUNICATIONS FEATURES

CCITT V.35 Interface (#1550): Provides interface to External Modems/Data Communication equipment to 56,000 bps or Direct Connection at speeds up to 9600 bps. Transmission over direct connection at speeds up to 9600 bps. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC code 31 or two FAC codes 08, 09. Maximum: For speeds up to 9600 bps one per selected Communication feature (#1602). For operation at speeds greater than 9600 bps, one per 8140 or one per 8140/8101. Field Installation: Yes. Prerequisites: #1602, #5200. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

| SDLC Communications With Business Machine Clock (#1601): (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 interface, integrated modems, direct connection and CCITT V.35 Interface. Limitations: Not available with the Expanded Function Operator Panel (#4545 - NO LONGER AVAILABLE) on the 8140 Models 41 through 44. Not available with the 8140 Models A51 through A74. In an 8100 System, only ten loop or SDLC communication ports may be active at one time. Maximum: Three with the 8140 Models A31 through A34 and two with the Models A41 through A44. Maximum is 19 per 8100 System (see Note) with 8140 Models A31 through A34, 18 with 8140 Models A41 through A44 or 16 with 8140 models A51 through A74. The maximum is reduced by one for each Communication feature (#1602) selected. Field Installation: Yes. Specify: Code as

provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications Without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/ V.28, CCITT X.21, CCITT X.21bis/V.28 interface, CCITT V.35 Interface and Loop Adapter. Limitations: Not available with the Expanded Function Operator Panel (#4545 - NO LONGER AVAILABLE) on 8140 Models 41 through 44. Not available with the 8140 Models A51 through A74. In an 8100 System only ten loop or SDLC communication ports may be active at one time. Maximum: Three with 8140 Models A31 through A34 and two with models A41 through A44. Maximum is 19 per 8100 System (see Note) with 8140 Models A31 through A34, 18 with 8140 Models A41 through A44, or 16 with 8140 models A51 through A74. The maximum is reduced by one for each Communication feature (#1601) (NO LONGER AVAILABLE), #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) selected. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| BSC/SS Communications With Business Machine Clock (#1603):
| (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 interface, integrated modems or direct connection. Limitations: Start/Stop communications are not available with integrated modems. Not available with the Expanded Function Operator Panel (#4545 - NO LONGER AVAILABLE) on the 8140 Models 41 through 44. Not available with the 8140 Models A51 through A74. In an 8100 System, the maximum aggregate BSC data rate is 19,200 bps and 660 bps for Start/Stop. BSC mutually exclusive with 8101-A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Maximum: Three with 8140 Models A31 through A34 and two with 8140 Models A41 through A44. Maximum is 19 per 8100 System (see Note) with 8140 Models A31 through A34, 18 with 8140 Models A41 through A44 or 16 with 8140 models A51 through A74. The maximum is reduced by one for each Communication feature (#1602) selected. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| BSC Communications Without Business Machine Clock (#1604):
| (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/ V.28/CCITT X.21bis/V.28 interface and direct-connect. Limitations: Not available with the Expanded Function Operator Panel (#4545 - NO LONGER AVAILABLE) on the 8140 Models 41 through 44. Not available with 8140 Models A51 through A74. In an 8100 System, the maximum aggregate BSC data rate is 19,200 bps. BSC mutually exclusive with 8101-A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Maximum: Three with the 8140 Models A31 through A34 and two with Models A41 through A44. Maximum is 19 per 8100 System (see Note) with 8140 Models A31 through A34, 18 with 8140 Models A41 through A44, or 16 with 8140 models A51 through A74. The maximum is reduced by one for each Communication feature (#1602) selected. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| PSNA (#2947): (NO LONGER AVAILABLE)

Provides control for

Provides for the attachment of Modem, Integrated, Switched, #5501 (NO LONGER AVAILABLE), to the Public Switched Telephone Network. Prerequisites: #5501 (NO LONGER AVAILABLE). Maximum: One per #5501 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #5501 (NO LONGER AVAILABLE).

EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface (#3701): Provides CCITT interface and cable for attachment of an external IBM modem or PTT-mandatory modem complying with CCITT Rec-

ommendations (1976) V.24, V.28, ISO Standard 2110 and other relevant non-IBM modems may be attached subject to the Multiple Supplier Systems Bulletin. Maximum: One per selected Communication feature (#1602). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE), #5200. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 or 38,400 bps. Limitations: Not available with the Expanded Function Operator Panel (#4545 - NO LONGER AVAILABLE) on the 8140 Models 41 through 44. Not available with the 8140 Models A51 through A74. Maximum: Three with 8140 Models A31 through A34 and two with the Models A41 through A44. Only two of these features may operate at 38,400 bps in an 8140/8101. The maximum is reduced by one for each selected communication facility attached to the 8140. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Limitations: Not available with 8140 Models A51 through A74. Maximum: Two per 8140 Models A31 through A34 and A41 through A44. Maximum is six per 8100 System (see Note) with the 8140 Models A31 through A34 and A41 through A44 or four with 8140 Models A51 through A74. Field Installation: Yes. Prerequisites: #4830. Specify: Code as provided in FAC description in the "Communication Capabilities" section.

Note: An 8100 System consisting of an 8140 Processor and attached 8101 Storage and I/O Units.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400, (FAC 44* only) 4800 bps and 9600 bps for direct connection facilities. Can provide multiple speeds simultaneously. Limitations: Not available with the 8140 Models A51 through A74. Maximum: One per 8140 Models A31 through A34 and models A41 through A44. Maximum is five per 8100 System with the 8140 Models A31 through A34 and A41 through A44 or four with the 8140 Models A51 through A74. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC description in the "Communication Capabilities" section. (*FAC code 44 is NO LONGER AVAILABLE.)

| Modem, Integrated, Nonswitched (#5500): (NO LONGER AVAILABLE)

Provides interface to PTT or common carrier leased facilities at 600 or 1200 bps. Limitations: Not available for Start/Stop communication facilities. Maximum: One per selected Communication feature: #1601 (NO LONGER AVAILABLE) or #1603 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE), #1603 (NO LONGER AVAILABLE) Specify: Code as provided in FAC description in the "Communication Capabilities" section. (Japan only> Specify #2943 for NTT D-1 line service.<)

| Modem, Integrated, Switched (#5501): (NO LONGER AVAILABLE)

(Except Japan) Provides interface to PTT or common carrier switched facilities with auto answer at 600 or 1200 bps. Limitations: Not available with Start/Stop communication facilities. Maximum: One per selected communication feature: #1601 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE). Specify: Code as provided in FAC description in the "Communication Capabilities" section.

(Japan only>X.21 Adapter For Nonswitched Networks (#5655): Provides interface for attachment to X.21 nonswitched DCE at speeds up to 48,000 bps in point-to-point or multipoint configurations. Limitations: Operation at 48,000 bps is mutually exclusive with FAC codes 29, or two FAC codes 08, 09. Maximum: One per selected Communications Feature (#1602). For operation at 48,000 bps one per 8140/8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communications Capabilities" section.<)

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

Model upgrades are available, however Model changes from 8140-A3X to 8140-A4X are not recommended for field installation. The 8140 Models A6X and A7X are available only for field upgrade. For Model changes that require replacement of a disk storage unit, adequate provisions must be made for retaining data contained in disk storage and elimination of user-proprietary information.

The following Model changes can be field installed:

	To	A 32	A 33	A 34	A 42	A 43	A 44	A 51	A 52	A 53	A 54
From											
A31		X	X	X				*	*	*	*
A32			X	X					*	*	*
A33				X						*	*
A34											*
A41					X	X	X	*	*	*	*
A42						X	X		*	*	*
A43							X			*	*
A44											*
A51									X	X	X
A52										X	X
A53											X
	To	A61	A62	A63	A64	A71	A72	A73	A74		
From											
A31		*	*	*	*	*	*	*	*	*	*
A32			*	*	*	*	*	*	*	*	*
A33				*	*	*	*	*	*	*	*
A34					*	*	*	*	*	*	*
A41		*	*	*	*	*	*	*	*	*	*
A42			*	*	*	*	*	*	*	*	*
A43				*	*	*	*	*	*	*	*
A44					*	*	*	*	*	*	*
A51		X	X	X	X	X	X	X	X	X	X
A52			X	X	X	X	X	X	X	X	X
A53				X	X	X	X	X	X	X	X
A54					X	X	X	X	X	X	X
A61			X	X	X	X	X	X	X	X	X
A62				X	X	X	X	X	X	X	X
A63					X	X	X	X	X	X	X
A64						X	X	X	X	X	X
A71							X	X	X	X	X
A72								X	X	X	X
A73									X	X	X

* Purchase price for this Model upgrade is configuration and feature dependent. The purchase customer must submit an RPQ.

Customer price quotations and customer order acknowledgements letters for purchase MES must state "Installation of this Model change involves the removal of parts which become the property of IBM".

ACCESSORIES

CABLES - LOOP

Loop cables can be purchased from IBM or a customer-selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide".

ing System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

- Other Loop Cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multi-use Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
 - Indoor Cable P/N 1657265: UL approved (style 2919) for interconnection of low voltage electronic equipment. Maximum allowable cable temperature range is -34C to +80C.
 - Indoor Cable P/N 7838694: UL approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34C to +90C.
 - Indoor Cable P/N 7838695: UL approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34C to +105C.
 - Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34C to +80C.
 - Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34C to +80C.
 - Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft.)

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft.). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8M (1,000 ft.).

Exterior cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3,000 ft.), by specifying the length wanted.) Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.
- Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multi-use Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

MACHINES

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

2 X 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called radials. The point where a radial line terminates at the LWC is called an LWC port. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36 x 30 x 15cm (14 x 12 x 6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36 x 30 x 15cm (14 x 12 x 6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer supplied volt-ohm meter, capable of reading 0.5 ohms and rated at least 5000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohm meter to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

Order via MES from Raleigh:

- 1657300, Loop Splice Plate (LSP) (indoor)
- 1657310, Loop Station Connector (Radial LSC)
- 1657320, Loop Station Connector (Wrap LSC)
- 1657260, Loop Station Connector Gasket
- 1657330, Loop Wiring Concentrator (LWC)
- 1657332, LWC Circuit Board Assy (order instead of LWC-1657330)*
- 1657350, Loop Surge Suppressor (LSS)
- 1657354, LSS Circuit Board Assy (order instead of LSS-1657350)*
- 1657420, Continuity and Relay Tester
- 1657325, Wrap Switch Access Cover
- 1657379, Loop Accessory Keys (10 spares)**
- 7838771, 2 x 4 Adapter Plate (2AP)

Order via MES from Fujisawa:

- 2102151, Conventional Box (indoor) 5 x 10cm (2 x 4 in.) Clamp (for cable to indoor box) 2100264
- 1657280, Environmental Box (outdoor) 7x11.5cm (2.75x4.5 in.) (For industrial use)
- 2114285, Environmental Clamp - small (for indoor cable to environmental box)
- 1657377, Environmental Clamp - large (for outdoor cable to environmental box)
- 1657292, Metric conduit adapter
- 1657305, Environmental Enclosure-NEMA-4X 36x30x15cm (14x12x6 in.)
- 1657306, Environmental Enclosure Mtg Pnl
- 1657307, Sealing - Locknut

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** 1 package (10 keys) shipped with each 8101 or 8140. 1 key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use Machine type 8101 or 8140.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments. However, see local CE management and GI section 65 for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuser Communications Loop Planning and Installation Guide", (GA27-3341) for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system. It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the Branch Office.

To enable a customer to test his installed loops it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

(Except French Canadian and Spanish > Relocate/Replace Kits: The material required to perform machine relocation or processor replacement has been grouped into machine type dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8140 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8101, 8102	4448550	4448551	N/A
8101, 8102 (w/ FC4525	6226687	6226686	N/A
8140	4448554	4448555	N/A

For 8100 Information Systems without 8101 or 8102 storage and I/O units attached:

Use Figure 2 below to order appropriate kit B/M.

Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without
8101 or 8102 Attached

Machine	Kit W/O Packaging Material	Kit With Packaging Material	Relocate Package
8140	4448577	4448578	N/A

<)

Kits For Systems With 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit With Packaging Material	Relocate Package
8101, 8102	6226492	6226496	N/A
8101, 8102 (w/FC4525	6423302	6423301	N/A
8140	6226494	6226498	N/A

Kits For Systems Without 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit With Packaging Material	Relocate Package
8140	6226501	6226504	N/A

Kits For Systems With 8101 or
8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8101, 8102	6226590	6226594	N/A
8101, 8102 (w/FC4525	6423304	6423303	N/A
8140	6226592	6226596	N/A

Kits For Systems Without 8101
or 8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8140	6226599	6226602	N/A

Kits For Systems With 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8101, 8102	6423295	6423296	N/A
8101, 8102 (w/FC4525)	6423297	6423298	N/A
8140	6423283	6423284	N/A

Kits For Systems Without 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package
8140	6423285	6423286	N/A

- Check for missing/damaged wrap plugs. If required, see the wrap plug entry in this section of the Sales Manual.
- Ordering Information: (Canada only> Order via MSORDER (category = supplies/ accessories Group Code = DP Supply Order)<) (Except Canada and Japan> Order via MES from Raleigh; <) (Japan only> Order via MES from Fujisawa. <)

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3.

Figure 3

Comm Feature	Comm Cable Grp No	Wrap Plug P/N
Loop Station Adapter (Single Lobe)	3709	7389282
DDSA	3717	6835350
V.35 Modem	3718	6835348
V.35 Direct Connect	3719	6835349
V.35 Direct Connect Pt to Pt	3720	6835642
EIA Direct Connect	3721	6835642
EIA Modem	3724	6835346
Loop Station Adapter (Double Lobe)	3726	7389282
EIA Direct Connect	3727	6835347
Pt to Pt		
X.21	3728	6835379

Ordering Information: Via Branch Office, Code 'S' from Mechanicsburg

COMMUNICATIONS

There are a variety of Communication Facilities (see M2700 pages) supported by the 8140 Models A31 through A44 Features for Attaching Communications (FAC) which differ in speed, protocol and attachment interfaces. These FAC codes have been categorized as LOOP, SDLC, BSC and START/STOP. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation FAC No.) for additional details. Reference to switched communications in the FAC codes, refers to the communication link between the 8100 System and the S/370.

The 8140 special features allow a maximum of three communication capabilities to be configured and designated as communication ports. Each communication port position (1 through 3) must consist of a communications feature for SDLC, BSC or Start/Stop.

The SDLC communications feature is available with and without business machine clock: #1601 (NO LONGER AVAILABLE), #1602. The BSC/SS communications feature: #1603 (NO LONGER AVAILABLE) is available with business machine clock and the BSC communications feature #1604 (NO LONGER AVAILABLE) is available without business machine clock. If an 8140 communication port is to provide the attached facility with business machine clock at

speeds greater than 2400 bps the Multi-Speed Clock feature (#5200) is required.

In addition to selecting a communications feature: #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE) for each port configured in an 8140, a communication interface or integrated modem must be selected to support the Communication Facility attaching to that port. A two-lobe loop port requires three special features (#1602, #4830 and #4835). Direct connect at 2400 (FAC 44 only) (NO LONGER AVAILABLE), 4800 and 9600 bps requires the Multi-Speed Clock feature (#5200). Each port of the 8140 also requires the selection of a specify code to indicate the System 8100 FAC code selected for that port. Certain System 8100 FAC Codes will require a second specify code to select options available within that facility: 2/4-wire or line speed.

Note: Within a given FAC, the selected option (2/4 wire, LPDA or line speed) can be changed in the field by Customer Engineering. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a FAC and its associated feature and specify codes must identify the original codes ordered from the factory.

Specify and FAC Code Descriptions: A specify code number is required to identify the selected FAC Code and its physical port position. The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9, e.g.:

#9ABC where AB = FAC No. and C = Port Position

FAC codes range in number from 08 to 61* resulting in FAC specify codes ranging in number from #9081 to #9613. (Some FAC codes are NO LONGER AVAILABLE. See FAC code description for availability.) Additional codes may be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. "Configuration Manual", GA27-2876, will aid in assigning the port positions.

LOOP

FAC No.	FAC Code Description
FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two lobes at 38,400 bps
FAC 10	Loop, single-lobe at 9600 bps
FAC 11	Loop, two-lobes at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Port position three not available with 8140 Models A41 through A44. Limitations: If two 08 FAC codes are specified, FAC codes 09, 29, 31 are not available. See Table 2 in 8100 System pages for system maximums. Maximum: Two per 8140 or two per 8140/8101. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3
Port		#9081	#9082	#9083

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: If two 09 FAC codes are specified, FAC codes 08, 29, 31 are not available. See Table 2 in 8100 System pages for system maximums. Prerequisites: #1602, #4830 and #4835. Maximum: Two per 8140 or two per 8140/8101. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3
Port		#9091	#9092	N/A

FAC 10 Loop, Single-Lobe: Required for operating a loop at 9600 bps. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3
Port		#9101	#9102	#9103

FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3
Port		#9111	#9112	N/A

SDLC

FAC No.	FAC Code Description
EIA RS-232-C/CCITT V.24/V.28,	
CCITT X.21bis/V.28	

FAC 12	(NO LONGER AVAILABLE) 600 or 1200 bps (External modem)
FAC 13	Up to 9600 bps (External modem)
FAC 15	(NO LONGER AVAILABLE) 600, 1200 or 2400 bps Direct connect with clock (No modem)
FAC 16	4800 or 9600 bps Direct connect with clock (No modem)
FAC 17	Direct connect without clock

Integrated Modem

FAC 18	(NO LONGER AVAILABLE) 600 or 1200 bps nonswitched
FAC 19	(NO LONGER AVAILABLE) 600 or 1200 bps switched with auto answer

CCITT V.35

FAC 24	(NO LONGER AVAILABLE) Direct connect with clock (No modem) 600, 1200 or 2400 bps
FAC 25	Direct connect with clock (No modem) 4800 or 9600 bps
FAC 27	Direct connect without clock (No modem) 9600 bps
FAC 29	Up to 56,000 bps nonswitched

CCITT X.21

FAC 30	Up to 9600 bps nonswitched
FAC 31	48,000 bps nonswitched

EIA RS-232-C/CCITT V.24/ V.28 Interface: (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock - operating with external modem without clocking - and point-to-point switched 2-wire - or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1601 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify	Selection	Port 1	Port 2	Port 3
Port		#9121	#9122	#9123

600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

FAC 13 EIA RS-232-C/CCITT V.24/ V.28, CCITT X.21bis/ V.28 Interface: Up to 9600 bps without business machine clock with external data communication equipment and clock point-to-point switched with auto answer to 9600 bps or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9131	#9132	#9133
LPDA	#9801	#9802	#9803

I EIA RS-232-C/CCITT V.24/ V.28 Interface: (NO LONGER AVAILABLE)

600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1601 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9151	#9152	#9153
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753
2400 bps	#9761	#9762	#9763

FAC 16 EIA RS-232-C/CCITT V.24/ V.28 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) and direct connection up to 40 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9161	#9162	#9163
4800 bps	#9771	#9772	#9773
9600 bps	#9781	#9782	#9783

FAC 17 EIA RS-232-C/CCITT V.24/ V.28 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 40 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9171	#9172	#9173

I FAC 18 Integrated Modem: (NO LONGER AVAILABLE)

600 or 1200 bps - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1601 (NO LONGER AVAILABLE) and #5500 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9181	#9182	#9183
2-wire			
600 bps	#9851	#9852	#9853
1200 bps	#9861	#9862	#9863

4-wire			
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

I FAC 19 Integrated Modem: (NO LONGER AVAILABLE)

(except Japan) 600 or 1200 bps - point-to-point switched with auto answer 2-wire. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1601 (NO LONGER AVAILABLE) and #5501 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9191	#9192	#9193
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

I FAC 24 CCITT V.35 Interface: (NO LONGER AVAILABLE)

600, 1200 or 2400 bps with business machine clock - operating with no modem (Attached machine must not have business machine clock) - and direct connection up to 1,000 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1601 (NO LONGER AVAILABLE) and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9241	#9242	#9243
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753
2400 bps	#9761	#9762	#9763

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (Attached machine must not have business machine clock) - and direct connection up to 1,000 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9251	#9252	#9253
4800 bps	#9771	#9772	#9773
9600 bps	#9781	#9782	#9783

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 1,000 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9271	#9272	#9273

FAC 29 CCITT V.35 Interface: Up to 56,000 bps without business machines clock and external data communication equipment with clock, and point-to-point or multipoint nonswitched. Port position three not available with 8140 Model A41 through A44. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC code 31 or two FAC codes 08, 09. See Table 2 in 8100 System pages for system maximums. Maximum: For operation at speeds greater than 9600 bps, one per 8140 or one per 8140/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 1	Port 2	Port 3
Port	#9291	#9292	#9293

(Japan only) > **FAC 30 - CCITT X.21 Interface:** Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched. Limitations: Port Position three not available with 8140 Model A41 through A44. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9301	#9302	#9303

FAC 31 - CCITT X.21 Interface: 48,000 bps without business machine clock and point-to-point or multipoint nonswitched operation. Port Position three not available with 8140 Model A41 through A44. Limitations: Mutually exclusive with FAC codes 29 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9311	#9312	#9313(<)

BSC

FAC No.	FAC Code Description

EIA RS-232-C/CCITT V.24/V.28/
CCITT X.21bis/V.28

FAC 40* 600 or 1200 bps (External modem)
FAC 41* Up to 9600 bps (External modem)
FAC 44* 2400, 4800 or 9600 bps direct
connect with clock (No modem)

Integrated Modem

FAC 45* 600 or 1200 bps nonswitched

FAC 40 EIA RS-232-C/CCITT V.24/ V.28 Interface: (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock - operating with external modem with no clock - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Port position three not available with 8140 Model A41 through A44. BSC mutually exclusive with 8101 A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9401	#9402	#9403
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

FAC 41 EIA RS-232-C/CCITT V.24/ V.28/CCITT X.21bis/ V.28 Interface: (NO LONGER AVAILABLE)

9600 bps without business machine clock - operating with external data communication equipment - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Port position three not available with 8140 Model A41 through A44. BSC mutually exclusive with 8101 A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9411	#9412	#9413

EIA FAC 44 RS-232-C/CCITT V.24/ V.28 Interface: (NO LONGER AVAILABLE)

2400, 4800 or 9600 bps with business machine clock - operating with no modem (attached downstream terminal must not provide business machine clock) - and direct connection to 40 ft. Limitations: Port position three not available with 8140 Model A41 through A44. BSC mutually exclusive with 8101 A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE), #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9441	#9442	#9443
2400 bps	#9761	#9762	#9763
4800 bps	#9771	#9772	#9773
9600 bps	#9781	#9782	#9783

FAC 45 Integrated Modem: (NO LONGER AVAILABLE)

600 or 1200 bps - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: Port position three not available with 8140 Model A41 through A44. BSC mutually exclusive with 8101 A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 System. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #5500 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9451	#9452	#9453
2-wire			
600 bps	#9851	#9852	#9853
1200 bps	#9861	#9862	#9863
4-wire			
600 bps	#9741	#9742	#9743
1200 bps	#9751	#9752	#9753

START/STOP

FAC No.	FAC Code Description

EIA RS-232-C/CCITT V.24/V.28

FAC 60* 110, 134.5, 150, 300 or 600 bps
(External modem)
FAC 61* 110, 134.5, 150, 300 or 600 bps
Direct connect with clock (No
modem)

* NO LONGER AVAILABLE

FAC 60 EIA RS-232-C/CCITT V.24/ V.28 Interface: (NO LONGER AVAILABLE)

110, 134.5, 150, 300 and 600 bps with business machine clock - operating with external modem - and point-to-point nonswitched facilities will be provided under provisions of the IBM Multiple Supplier System Policy. (See GI pages.) See M2700 pages for specific information on communication facilities and other attachment information. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1603 (NO LONGER AVAILABLE), #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

MACHINES

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9601	#9602	#9603
110 bps	#9701	#9702	#9703
134.5 bps	#9711	#9712	#9713
150 bps	#9721	#9722	#9723
300 bps	#9731	#9732	#9733
600 bps	#9741	#9742	#9743

FAC Specify Selection	Port 1	Port 2	Port 3
Port	#9611	#9612	#9613
110 bps	#9701	#9702	#9703
134.5 bps	#9711	#9712	#9713
150 bps	#9721	#9722	#9723
300 bps	#9731	#9732	#9733
600 bps	#9741	#9742	#9743

I EIA RS-232-C/CCITT V.24/ V.28 Interface: (NO LONGER AVAILABLE)

110, 134.5, 150, 300, 600 bps with business machine clock - operating with no modem (the attached terminal must provide its own business machine clock) - and direct connect to 40 ft. Limitations: Port position three not available with 8140 Model A41 through A44. Prerequisites: #1603 (NO LONGER AVAILABLE), #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

DEVICE ATTACHMENT

Direct-Attached Devices: Devices that can attach directly to the processor are --- 8101, 8102 Storage and I/O Unit --- 8809 Magnetic Tape Unit.

Loop-Attached-Devices: The following devices can attach to a direct-attached loop or to a data link-attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

Device and Mdl	Loop Attachment		
	Direct At 9600 bps	At 38400 bps	Data Link At 2400, 4800,9600 bps
3104 Display Terminal B1, B2	X	X	X
3230 Printer 1	X	X	X
3232 Keyboard Printer Terminal Model 11	X	X	X
3262 Printer 2,12	(1)	X	(1)
3268 Printer 1	X	X	X
3274 Control Unit 51C,61C with:	X	X	X
- 3178 Display Terminal			
- 3179 Color Display Station Model 1			
- 3179 Color Graphics Display Station - Model G1, G2			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 3,13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4,5			
- 3279 Color Display Unit 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3274 Control Unit 52C with:	X	X	X
- 3178 Display Terminal			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3268 Printer 2			
- 3278 Display Station 1,2,52			
- 3283 Printer 52			
- 3287 Printer 1,2			
3276 Control Unit Display Station 11,12,13,14 with:	X		X
- 3178 Display Terminal			
- 3179 Color Display Station			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4			
- 3279 Color Display 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3287 Printer 11,12	X	X	X
3289 Printer 3 with:	(1)		(1)
- 2502 Card Reader A1*			
- 3501 Card Reader			

- 3521 Carder Punch*
(*Requires 3782 Attachment Unit)

3641	Reporting Terminal 1,2	X		X
3642	Encoder Printer 1,2	X		X
3643	Keyboard Display 2,3,4	X		X
3644	Automatic Data Unit	X		X
3645	Printer	X		X
3646	Scanner Control Unit	X		X
3647	Time and Attendance Terminal	X		X
4701	Finance Communication Controller Model 1,2	X	X	X
5210	Printer E01, E02	X		
7426	Terminal Interface Unit 1, with associated terminals	X	X	X
8775	Display Terminal 1,2	X	X	X

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data see the M2700 pages and appropriate machine pages for additional information.

Refer to the "IBM Information System Configurator" GA27-2876 for selection of 8100 FAC codes.

- Devices conforming to TTY 33/35 or equivalent
- 2741 Communication Terminal
- Terminals conforming to 2780/3780 line protocol
- 3232 Keyboard Printer Model 1
- 3101 Display Terminal Models 10, 12, 13
- 3161 Display Station Model 11, 12
- 3163 Display Station Model 11, 12
- 3274 Control Unit Model 51C, 61C with:
 - 3178 Display Terminal
 - 3179 Color Display Station Model 1
 - 3179 Color Graphics Display Station Model G1, G2
 - 3180 Display Station Model 1 (available only when emulating a 3278)
- 3230 Printer 2
- 3268 Printer 2
- 3262 Printer Models 3, 13
- 3278 Display Station Models 1, 2, 3, 4, 5
- 3279 Color Display Station Models 2A, 2B, 3A, 3B
- 3287 Printer Models 1, 2, 1C, 2C
- 3289 Line Printer Models 1,2
- 3276 Control Unit Display Station Models 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: (*These Models are supported in SDLC mode.)
 - 3178 Display Terminal
 - 3179 Color Display Station (not supported on 3276 Model 1)
 - 3180 Display Station Model 1 (available only when emulating a 3278)
- 3230 Printer 2
- 3262 Printer Model 13
- 3268 Printer 2
- 3278 Display Station Models 1, 2, 3, 4 (See M3276 for configuration details.)

- 3279 Color Display Station Models 2A, 2B, 3A, 3B (Not supported on 3276 Models 1, 2, 3, 4)
- 3287 Printer Models 1, 2, 1C, 2C
- 3289 Line Printer Models 1, 2

- 3600 Finance Communication Controllers
- 3630 Plant Communication Controllers
- 3651 Store Controllers Models 25, 75
- 3684 Point of Sale Control Unit Models 1, 2
- 3767 Communication Terminal Models 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit
- 4700 Finance Communication Controllers
- 4952, 4954, 4955, 4959 Processor (Series/1)
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6360, 6580 Displaywriter (3270 DSC Mode only)
- 6670 Information Distributor Models 1, 2
- 7426 Terminal Interface Unit Model 2, with associated terminals
- 8101 Storage and I/O Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 8775 Display Terminal Models 11, 12

*Specify #9770 is available to facilitate problem determination.

Direct Connection Attachment: In addition to terminal attachment to 8100 System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The direct connect is made by using SDLC (FAC 15*, 16, 17, 24*, 25, or 27), BSC (FAC 44*) and Start/Stop (FAC 61*). (*NO LONGER AVAILABLE) Shown below are the direct connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884 will assist in the selection of direct connect cables.

Attaching Device	Speeds bps	Attaching Device Feature No.	8100 FAC CODE
2741	134.5	#9114** and #3255**	61**

Devices
Conforming
to 2780/3780

Line	2400,4800, 9600	Refer to specific device	44**
Protocol	110,150,300	None required	61**
3101, 3161	600		
3163			
3232-1	1200,2400 4800,9600	None None	15** 16
3274-51C, 61C	1200,2400 4800,9600	#3701 and #6302** #3701 and #6302**	15** 16
	1200,2400 4800,9600	#1550 and #6302** #1550 and #6302**	24** 25
3276	600,1200, 2400 4800,9600	#3701 w #9491** and #6302** #3701 w #9491** and #6302**	15** 16
3651 25/75	4800	#2827**	16*
3705-II	600,1200, 2400 4800,9600	#4714** #4714**	15** 16
3705-80	600,1200, 2400 4800,9600	None None	15** 16
3725	600,1200, 2400 4800,9600	#4911** #4911**	15** 16
3767	600,1200, 2400	#3718 w #9707** and #9533**	15**
4701	1200,2400 4800,9600	None None	15** 16
4952, 4953 4955, 4959	1200,2400 4800,9600	#2090** #2080**	15** 16
6360	1200,2400 4800,9600	#3707** #3707**	15** 16
6580-A04, B04	1200,2400 4800,9600	#3705** #3705**	15** 16
6670-1,2	600,1200, 2400,4800	#9420** #9420**	15** 16
6670-2	9600	#9420**	16
7426-2	600,1200,2400 4800,9600	None None	15** 16
8101,8130	600,1200, 2400	FAC 17 (see Note)	15**
8140,AXX	600,1200, 2400	FAC 27 (see Note)	24**
BXX	4800,9600 4800,9600	FAC 17(see Note) FAC 27(see Note)	16 25
8140,CXX	4800	#1621 and #9688** (see Note)	16

MACHINES

8150	4800,9600	#1733** and #9688** or #1734** and #9698** (see Note)	16
8775	600,1200, 2400	#3701	15**
	4800,9600	#3701	16
	600,1200, 2400	#1550	24**
	4800,9600	#1550	25

Note: FAC 17 or 27 in the attaching 8101, 8130, 8140 AXX, BXX ,
#1621 on 8140 Model C or #1733** or #1734** on 8150 without busi-
ness machine clock.

** (NO LONGER AVAILABLE)

8140 PROCESSOR MODELS B51 - B72

(NO LONGER AVAILABLE)

PURPOSE

The 8140 Processor provides control, storage, processing capability, disk and diskette storage, and device attachment capabilities for the 8100 Information System.

MODELS B51, B51, B61, B62, B71, B72

	Base Processor Storage (bytes)	Non-Removable Disk Capacity (mill. bytes)	Fixed Head Capacity (bytes)
B51	512K (524,288)	58MB (58,654,720)	131,072
B52	512K (524,288)	123MB (123,174,912)	131,072
B61	768K (786,432)	58MB (58,654,720)	131,072
B62	768K (786,432)	123MB (123,174,912)	131,072
B71	1024K (1,048,576)	58MB (58,654,720)	131,072
B72	1024K (1,048,576)	123MB (123,174,912)	131,072

Maximum: One per 8100 Information System.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8140 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8140 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions. Optional instructions are available for floating point arithmetic. Eight I/O interrupt levels provide for interrupt processing. The 8140 offers various amounts of bytes of processor storage. Depending on the Model processor selected, processor storage can be up to a maximum of 1,024K (1,048,576 bytes). Capability for dynamic addressing and storage protection for up to 4 million bytes of logical storage is also available.

The 8140 Models B51 through B72 allow for the attachment of up to four 8101 or 8102 Storage and I/O Units or three 8101 or 8102 Storage and I/O Units and one 8809 Magnetic Tape Unit Model 1B. An alternate configuration can consist of an 8140, four 8101 or 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit Model 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit Model 1A or 1B.

The 8140 Processor is provided with fixed high-speed direct access storage. Disk storage of up to 123 million bytes with movable and fixed heads is available. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds, with an average rotational delay of 9.6 milliseconds. Removable diskette storage is available with up to 1MB (985,088 bytes) of storage operating at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370, 4341, 4381, or 9370 Processors via the 3704, 3705, 3720 or 3725 for SNA/SDLC or BSC line control. The 8100 System attaches to the ICA of the 115, 125, 135 or 138 Processors for BSC line control. The 8100 System can attach to the communications adapter of the 4331, 4361, or 9370 Processor for BSC and/or SDLC line control. For specific attachment, see M2700 pages.

The capability of the 8100 Information System is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8140 via communication features which include data link, direct-connect, and loops that are direct-attached or data link-attached. Up to 11 communication ports can be attached to the 8140 Models B51 through B72.

Physical security is provided through the use of key locks on the operator panel, diskette drive and machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8140 Processor is designated as a customer setup unit, thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8140. Customer setup instructions will be shipped with each machine. An 8140 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuser Communications Loop Planning and Installation Guide", GA27-3341 for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Selected Configurations: To ease the selection, configuring, ordering and installation of an 8140 Processor, several selected configurations have been developed. These selected configurations are designed to be applicable for the majority of customer installations. Both DPPX and DPCX are supported. The use of Selected Configurations is recommended. Traditional configuration selection and ordering should be used for configurations not included in the selected configurations. For additional information see "Selected Configurations Ordering Guide", ZZ20-4598.

Publications: GC20-8100.

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture.

- **Relocation:** If the user relocates and/or interchanges an attaching 8101 or 8102 from one 8100 system to another, the user must consider address compatibility of the processor and its attachments. For further information, see "IBM 8100 Information System Site Planning Guide", GA27-2884. For relocation/replacement kit ordering see "Relocate/Replace 8100 System Accessories".
- **Upending:** In the event the 8140-BXX must be placed on end to maneuver to the installation site, specify #9840. For additional ordering information associated with specify #9840, see Accessories "Upending Feature, 8140". Field Installation: Yes.
- **Color:** Pebble gray is the only available color.

- **Cabling:** For loop cabling information, see "Accessories" and the "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.
 - **Machine Nomenclature:**

English US	#2924
Spanish	#2931
Brazilian (Portuguese)	#2933
Canadian French	#2935
 - **Programming Configuration:** Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations. Field Installation: Yes.
 - **8101/8102 Attachment:** Order #9939 for the first 8102 being attached to any Model 8130 or 8140 processor. If the 8102 has feature #4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and secondary processors. This specify code supplies updated maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.
 - (Canada only) > **Voltage (AC, 1-phase, 3-wire, 60 Hz):** Specify #9884 for 208V, #9894 for 240V. For conversion between 208V AC and 240V AC, contact your local CE representative. If standard 4.3m (14 ft) cable is not required, also specify #9986 for 1.8m (6 ft) cable. <
 - (Except Canada) > **Power (AC, 1-phase, 3-wire):**

50 Hz	60 Hz
200V #2806	200V #2732
220V #2813	208V #9902
230V #2821	220V #2803
240V #2801	240V #2831<

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.
 - (Japan only) > Specify #9890 for locking plug, #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated. <
- Note:** (Except Canada and Japan) > The 3-digit Country Code on the DPMO Sheet will be used to select a power plug which matches the most commonly used power supply in the country. <
- **Industrial Automation Systems specify:**
 - Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, processor controllers, etc. Also includes power management systems.

SPECIAL FEATURES

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, communication facilities, the operating system installed and the application work load. The maximum number of communications features which can be physically installed can exceed the operational capability. Increased processor utilization will result from sustained operation of BSC #1603 (NO

LONGER AVAILABLE) and #1604 (NO LONGER AVAILABLE) at the maximum aggregate data rate and may cause degradation of activity operating at lower priority levels. Analysis should be performed to determine the impact.

Note: Use of BSC 8101-A2X feature #1605 (NO LONGER AVAILABLE) instead of features #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System publications are dependent on the presence of functional support modules provided by DPPX, DPCX. Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the "Functional Definition Manual 8100" which will be available from Mechanicsburg at FCS.

I Display And Printer, Additional (#1506): (NO LONGER AVAILABLE)

Provides for the attachment of additional 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to four. Maximum: Five. Field Installation: Yes. Prerequisites: #3220 (NO LONGER AVAILABLE).

Communication Attachment (#1701): Allows the expansion of communication capabilities to include ports 5-8 or 9-12. Additional special features for line control, communication interface and modems are required to complete each communication port selected. Limitations: Port positions 9-12 not available with Display and Printer Attachment, #3220 (NO LONGER AVAILABLE), Magnetic Tape Attachment (#4901) or Floating Point #3750 (NO LONGER AVAILABLE). See Table 1 for additional information. Maximum: Order once for port positions 5-8. Order again for port positions 9-12. Field Installation: Yes. Prerequisites: #3901 for first #1701 (ports 5-8).

I Display And Printer Attachment (#3220): (NO LONGER AVAILABLE)

Provides for the attachment of 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to four. Can be expanded to a maximum of 24 devices with Display and Printer, additional #1506 (NO LONGER AVAILABLE). Limitations: Not available with Communication Attachment (#1701), ports 9-12, Magnetic Tape Attachment (#4901), or Communication Attachment (#1701) ports 5-8 and Floating Point #3750 (NO LONGER AVAILABLE). See Table 1 for additional information. Maximum: One per 8140. Field Installation: Yes. Prerequisites: #3901 when ordered without #1701 (ports 5-8).

I Floating Point (#3750): (NO LONGER AVAILABLE)

Provides for execution of 30 floating point instructions and 32 floating point registers to improve performance of floating point operations. The instructions provide for loading, adding, subtracting, comparing, multiplying, dividing, storing and controlling the sign of short (4-byte) operands and long (8-byte) operands. Limitations: Not available with Communication Attachment (#1701) ports 9-12, or Display and Printer Attachment, #3220 (NO LONGER AVAILABLE) with Communication Attachment (#1701) ports 5-8, or Magnetic Tape Attachment (#4901) with Communication Attachment (#1701) ports 5-8. Maximum: One. Field Installation: Yes.

Feature Expansion Prerequisite (#3901): Required for first Communication Attachment (#1701) ports 5-8 or Display and Printer Attachment, #3220 (NO LONGER AVAILABLE), without Communication Attachment (#1701) or Magnetic Tape Attachment (#4901) without Communication Attachment (#1701). Maximum: One. Field Installation: Yes. Prerequisites: #1701 or #3220 (NO LONGER AVAILABLE) or #4901.

I Expanded Function Operator Panel (#4545): (NO LONGER AVAILABLE)

This feature provides operator access to processor storage, program stop and restart capability and current operating indicators. Maximum: One. Field Installation: Yes.

Magnetic Tape Attachment (#4901): Provides for the attachment of up to four 8809 Magnetic Tape Units, consisting of one 8809 Model 1A plus two Model 2s and one Model 3. Limitations: Not available if the 8101 or 8102 Storage and I/O Unit has the 8809 Magnetic Unit Model 1A attached (#4521) or if 8809 Model 1B is attached to the 8140 Model BXX Processor. Not available with Display and Printer Attachment, #3220 (NO LONGER AVAILABLE), Communication Attachment (#1701), ports 9-12, or Communication Attachment (#1701), ports 5-8 and Floating Point, #3750 (NO LONGER AVAILABLE). See Table 1 for additional information. Maximum: One. Field Installation: Yes. Prerequisites: #3901 when ordered without #1701 (ports 5-8).

Table 1

When configuring the 8140 for Communication, Display/Printer, Magnetic Tape attachments, the table below shows the combinations of these features that may be configured.

#3901 PLUS: #1701 or #3220 (NO LONGER AVAILABLE) or #4901 OR
#3901 PLUS #1701 PLUS: #1701 or #3220 (NO LONGER AVAILABLE) or #4901

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	System* Maximum	System Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

Selected Configurations

The following table lists the appropriate selected configuration codes for each Model and the communication capabilities for each selected configuration.

Description	CODE
8140 Models B51, B52, B61, B62, B71, B72	1 1 1 1 1 1 1 1 1
Port 2 Dir Att Loop	0 0 0 0 0 0 0 0 0
- 38.4KB	0 0 0 0 0 0 0 1 1
- 9.6KB	2 3 4 5 6 8 9 0 1
Port 3 Dir-Att Loop	
9.6KB	x x x x x x x x x
Port 4 Data Link	
9.6KB	x x - x x x x x x
Port 5 Data Link	x x x x x x x x x

9.6KB	- - x x x - x x x
Port 6 Data Link	
9.6KB	- - - - - - - x x
Port 7 Dir-Att Loop	
9.6KB	- x - - x - - - -
Port 8 Data Link	
9.6KB	- - - - - - - - x

Notes:

- Magnetic tape attachment to 8140, use 8809 Model 1B.
- Recommended DPPX configurations:
 - No less than 512K processor storage
 - No less than 58MB disk storage
 - Fixed Head feature in processor disk

Selected Configuration Attachment (#1002): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1003): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- an SDLC link up to 9600 bps in Port 4 --- and a single-lobe, 9600 bps loop in Port 7. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1004): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- and an SDLC link up to 9600 bps in Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1005): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1006): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- an SDLC link up to 9600 bps in Port 4 and Port 5 --- and a single-lobe, 9600 bps loop in Port 7. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1008): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1009): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1010): (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4, Port

5 and Port 6. See Table 5 for component features. Maximum: One. Field Installation: Yes.

| **Selected Configuration Attachment (#1011):** (NO LONGER AVAILABLE)

Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 and Port 7 --- and an SDLC link up to 9600 bps in Port 4, Port 5, Port 6 and Port 8. See Table 5 for component features. Maximum: One. Field Installation: Yes.

COMMUNICATIONS and LOOPS

CCITT V.35 Interface (#1550): Provides interface to external modems/data communication equipment to 56,000 bps or Direct Connection at speeds up to 9600 bps and at 56,000 bps. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 31, 33, or two FAC codes 08, 09. Maximum: For speeds up to 9600 bps, one per selected Communication feature, #1601 (NO LONGER AVAILABLE) or #1602. For operation at speeds greater than 9600 bps, one per 8140 or one per 8140/8101. Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE) --- #1602 and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| **SDLC Communications with Business Machine Clock (#1601):** (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems, direct connection and CCITT V.35 Interface. Limitations: In an 8100 System, only ten loop or SDLC communication ports may be active at one time. Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature, #1602, #1603 (NO LONGER AVAILABLE), or #1604 (NO LONGER AVAILABLE) selected. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. Prerequisites: #1701 for ports 5-12.

SDLC Communications without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface, CCITT V.35 Interface and Loop Adapter. Limitations: In an 8100 System only ten loop or SDLC communication ports may be active at one time. Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature: #1601 (NO LONGER AVAILABLE), #1603 (NO LONGER AVAILABLE) or #1604 (NO LONGER AVAILABLE) selected. Field Installation: Yes. Prerequisites: #1701 for ports 5-12. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| **BSC/SS Communications with Business Machine Clock (#1603):** (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems or direct connection. Limitations: Start/Stop Communications are not available with integrated modems. In an 8100 System, the maximum aggregate BSC data rate is 19,200 bps and 660 bps for Start/Stop. BSC mutually exclusive with 8101-A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature: #1601 (NO LONGER AVAILABLE), #1602 or #1604 (NO LONGER AVAILABLE) selected. Field Installation: Yes. Prerequisites: #1701 for ports 5-12. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| **BSC Communications without Business Machine Clock (#1604):** (NO LONGER AVAILABLE)

Provides control for EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface and direct connection. Limitations: In an 8100 System, the maximum aggregate BSC data rate is 19,200 bps. BSC mutually exclusive with 8101-A2X FAC Codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE).

ABLE). Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature: #1601 (NO LONGER AVAILABLE), #1602, or #1603 (NO LONGER AVAILABLE) selected. Field Installation: Yes. Prerequisites: #1701 for ports 5-12. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| **PSNA (#2947):** (NO LONGER AVAILABLE)

Provides for the attachment of Modem, Integrated, Switched, #5501 (NO LONGER AVAILABLE) to the Public Switched Telephone Network. Maximum: One per #5501 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #5501 (NO LONGER AVAILABLE).

EIA RS-232-C/CCITT V.24/V.28 CCITT X.21bis/V.28 Interface (#3701): Provides interface to external modems/data communication equipment or direct connection at speeds up to 9600 bps. Maximum: Seven. One per selected Communication feature: #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), or #1604 (NO LONGER AVAILABLE) in ports 2-8. Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE), #1602 and #5200, #1604 (NO LONGER AVAILABLE) and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 or 38,400 bps. Maximum: 11. 19 per 8100 System. Only two of these features may operate at 38,400 bps in an 8140/8101. The maximum is reduced by one for each selected communication facility attached to the 8140. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: Three. One for ports 2-4 and one for each #1701. Maximum is five per 8100 System. Field Installation: Yes. Prerequisites: #4830. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400, (FAC 44 only - NO LONGER AVAILABLE) 4800, 9600 and 56,000 bps for direct connection facilities. Can provide multiple speeds simultaneously. Maximum: Three. One for ports 2-4 and one for each #1701. Maximum is five per 8100 System. Field Installation: Yes. Prerequisites: #1602 or #1604 (NO LONGER AVAILABLE). Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

| **Modem, Integrated, Nonswitched (#5500):** (NO LONGER AVAILABLE)

Provides interface to PTT or common carrier leased facilities at 600 or 1200 bps. Limitations: Not available for Start/Stop communication facilities. Maximum: One per selected Communication feature: #1601 (NO LONGER AVAILABLE) or #1603 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE) or #1603 (NO LONGER AVAILABLE). Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. (Japan only > Specify #2943 for NTT D-1 line service. <)

| **(Except Japan > Modem, Integrated, Switched (#5501):** (NO LONGER AVAILABLE)

Provides interface to <) (Except Japan > PTT or <) (Except Japan > common carrier switched facilities with auto answer at 600 or 1200 bps. Limitations: Not available with Start/Stop communication facilities. Maximum: One per #1601 (NO LONGER AVAILABLE). Field Installation: Yes. Prerequisites: #1601 (NO LONGER AVAILABLE). <) (Except Japan > Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. <)

X.21 Adapter for Nonswitched Networks (#5655): Provides interface for attachment to X.21 data communication equipment nonswitched at speeds up to 48,000 bps in point-to-point or multipoint configurations. Maximum: One per selected Communication feature (#1602). One per 8140 or one per 8140/8101. Limitations: Operation at 48,000

bps is mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.

X.21 Adapter for Switched Networks (#5656): Provides interface for attachment via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21, as it is delineated in GA27-3287, switched at speeds up to 48,000 bps. Limitations: Operation at greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 29, 31 or two FAC codes 08, 09. Maximum: One per #1602. For operation at greater than 9600 bps, one per 8140 or one per 8140/8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.

MODEL CONVERSIONS

I (NO LONGER AVAILABLE)

The following Model changes can be field installed:

To	B52	B61	B62	B71	B72
From					
B51	X	X	X	X	X
B52			X		X
B61			X	X	X
B62					X
B71					X

ACCESSORIES

I (NO LONGER AVAILABLE)

CABLES - LOOP

Loop cables can be purchased from IBM or a customer-selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.
- Other Loop Cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multi-use Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
- Indoor Cable P/N 1657265: UL approved (style 2919) for interconnection of low voltage electronic equipment. Maximum allowable cable temperature range is -34C to +80C.
- Indoor Cable P/N 7838694: UL approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34C to +90C.
- Indoor Cable P/N 7838695: UL approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34C to +105C.
- Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34C to +80C.
- Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34C to +80C.
- Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft)

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8M (1,000 ft).

Exterior cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3,000 ft), by specifying the length wanted. Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multi-use Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

2 X 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called radials. The point where a radial line terminates at the LWC is called an LWC port. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two out-

door cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer-supplied volt-ohmm, capable of reading 0.5 ohms and rated at least 5000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohmm to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

- 1657300, Loop Splice Plate (LSP) (indoor)
- 1657310, Loop Station Connector (Radial LSC)
- 1657320, Loop Station Connector (Wrap LSC)
- 1657260, Loop Station Connector Gasket
- 1657330, Loop Wiring Concentrator (LWC)
- 1657332, LWC Circuit Board Assy (order instead of LWC-1657330)*
- 1657350, Loop Surge Suppressor (LSS)
- 1657354, LSS Circuit Board Assy (order instead of LSS-1657350)*
- 1657420, Continuity and Relay Tester
- 1657325, Wrap Switch Access Cover
- 1657379, Loop Accessory Keys(10 spares)**
- 7838771, 2 x 4 Adapter Plate (2AP)

Order via MES from Fujisawa:

- 2102151, Conventional Box (indoor) 5 x 10cm - (2 x 4 inches)
- 2100264, Clamp (for cable to indoor box)
- 1657280, Environmental Box (outdoor) 7 x 11.5cm - (2.75 x 4.5 in) (For industrial use)
- 2114285, Environmental Clamp - small (for indoor cable to environmental box)
- 1657377, Environmental Clamp - large (for outdoor cable to environmental box)
- 1657292, Metric conduit adapter
- 1657305, Environmental Enclosure - NEMA - 4X 36 x 30 x 15cm (14 x 12 x 6 in.)
- 1657306, Environmental Enclosure Mtg Pnl
- 1657307, Sealing - Locknut

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** One package (ten keys) shipped with each 8101 or 8140. One key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use machine type 8101 or 8140.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments. However, see local CE management and GI section 65 for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the branch office.

To enable a customer to test his installed loops it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

Relocate/Replace Kits(Except French Canadian and Spanish): The material required to perform machine relocation or processor replacement has been grouped into machine type-dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8140 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	4448550	4448551	N/A
8101,8102 (w/ FC4525)	6226687	6226686	N/A
8140	4448556	4448557	4448558

* With packing material for units with upending feature (#9840) previously installed.

For 8100 Information Systems without 8101 or 8102 storage and I/O units attached:

- Use Figure 2 below to order appropriate kit B/M.
- Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without
8101 or 8102 Attached

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	4448579	4448580	4448549

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226492	6226496	N/A
8101,8102 (w/ FC4525)	6423302	6423301	N/A
8140	6226495	6226499	6226851

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101

or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit With Packaging Material	Relocate Package*
8140	6226502	6226505	6226852

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226590	6226594	N/A
8101,8102 (w/FC4525)	6423304	6423303	N/A
8140	6226593	6226597	6226849

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6226600	6226603	6226850

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6423295	6423296	N/A
8101,8102 (w/FC4525)	6423297	6423298	N/A
8140	6423287	6423288	6423289

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6423290	6423291	6423292

* With packing material for units with upending feature (#9840) previously installed.

- Check for missing/damaged wrap plugs. If required, see "Wrap Plugs" below.
- If up-ending is required to position the 8140, see "Upending Feature - 8140" below.

- Ordering Information: (Canada only> Order via MSORDER (category = supplies/ accessories Group Code = DP Supply Order)<) (Except Canada and Japan> Order via MES from Raleigh.<) (Japan only> Order via MES from Fujisawa.<)

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3.

Figure 3

Comm Feature	Comm Cable Grp No	Wrap Plug Part No
Loop Station Adapter (Single Lobe)	#3709	7389282
DDSA	#3717	6835350
V.35 Modem	#3718	6835348
V.35 Direct Connect	#3719	6835349
V.35 Direct Connect Pt To Pt	#3720	6835642
EIA Direct Connect	#3721	6835642
EIA Modem	#3724	6835346
Loop Station Adapter (Double Lobe)	#3726	7389282
EIA Direct Connect Pt to Pt	#3727	6835347
X.21	#3728	6835379

Ordering Information: Via Branch Office from Mechanicsburg

SUPPLIES (NONE)

COMMUNICATION CAPABILITIES

There are a variety of Communication Facilities (see M2700 pages) supported by the 8140 Models B51 through B72 Features for Attaching Communications (FAC) which differ in speed, protocol and attachment interfaces. These FAC codes have been categorized as LOOP, SDLC, BSC and Start/Stop. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation 'FAC No.') for additional details. Reference to switched communications in the FAC codes refers to the communication link between the 8100 System and the S/370.

The 8140 Models B51 through B72 special features allow a maximum of 11 communication capabilities to be configured and designated as communication ports. Each communication port position (2 through 12) must consist of a communications feature for SDLC, BSC or Start/Stop.

Planning: When configuring communication ports for 8140 Model B, thought should be given to possible future upgrades to 8140 Model C in a network. These activities may be easier to implement if the port assignment capabilities of the 8140 Models C (feature codes #1610 through #1614 plus #1620, #1621 and #1630) are studied first and the communication port assignment for the 8140 Model B is then made in a way to minimize future reassignments and address changes. The SDLC communications feature is available with and without business machine clock: #1601 (NO LONGER AVAILABLE), #1602. The BSC/SS communications feature, #1603 (NO LONGER AVAILABLE), is available with business machine clock and the BSC communications feature #1604 (NO LONGER AVAILABLE) is available without business machine clock. If an 8140 communication port is to provide the attached facility with business machine clock at speeds of 2400 bps or greater for FAC 44 (NO

LONGER AVAILABLE) or 4800 bps or greater for other FAC codes. The Multi-Speed Clock feature (#5200) is required.

In addition to selecting a communications feature: #1601 (NO LONGER AVAILABLE), #1602, #1603 (NO LONGER AVAILABLE), #1604 (NO LONGER AVAILABLE) for each port configured in an 8140, a communication interface or integrated modem must be selected to support the Communication Facility attaching to that port. A two-lobe loop port requires three special features (#1602, #4830 and #4835). Direct connect at 2400, (FAC 44 only - NO LONGER AVAILABLE) 4800, 9600 and 56,000 bps requires the Multi-Speed Clock feature (#5200). Each port of the 8140 also requires the selection of a specify code to indicate the System 8100 FAC code selected for that port. Certain System 8100 FAC Codes will require a second specify code to select options available within that facility: 2/4-wire or line speed.

Note: Within a given FAC, the selected option (2/4 wire, LPDA or line speed) can be changed in the field by the CE. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a FAC and its associated feature and specify codes must identify the original codes ordered from the factory.

Specify and FAC Code Descriptions: A specify code number is required to identify the selected FAC Code and its physical port position. The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9 or 8 (where "9" is for ports 2 through 8 and "8" for ports 9 through 12), e.g., #9ABC or #8ABC where AB = FAC No. and C = Port Position.

FAC codes range in number from 08 to 61. (Some of these codes are NO LONGER AVAILABLE. See FAC code descriptions for availability.) Additional codes may be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. "Configuration Manual", GA27-2876, will aid in assigning the port positions.

LOOP

FAC No.	FAC Code Description
FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two-lobe at 38,400 bps
FAC 10	Loop, single-lobe at 9600 bps
FAC 11	Loop, two-lobe at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Limitations: If two 08 FAC codes are specified, FAC codes 09, 26, 28, 29, 31, or 33 are not available. Maximum: Two per 8140 or two per 8140/8101. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify Selection	Port 2	Port 3
Port	#9082	#9083
	Port 4	Port 5
Port	#9084	#9085
	Port 6	Port 7
Port	#9086	#9087
	Port 8	Port 9
Port	#9088	#9081
	Port 10	Port 11
Port	#8082	#8083
	Port 12	Port 12
Port	#8084	

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: If two 09 FAC codes are specified, FAC codes 08, 26, 28, 29, x31, or 33 are not available. Maximum: Two per 8140 or two per 8140/8101. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9092	#9093	#9094
	Port 5	Port 6	
Port	#9095	#9096	
	Port 7	Port 8	Port 9
Port	#9097	#9098	#8091
	Port 10	Port 11	Port 12
Port	#8092	#8093	#8094

FAC 10 Loop, Single-Lobe: Required for operating a loop at 9600 bps. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9102	#9103	#9104
	Port 5	Port 6	
Port	#9105	#9106	
	Port 7	Port 8	Port 9
Port	#9107	#9108	#8101
	Port 10	Port 11	Port 12
Port	#8102	#8103	#8104

FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required codes to complete the configuration for each port selected. Maximum: Three, one for ports 2-4, one for ports 5-8 and one for ports 9-12. Two with FAC 09.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9112	#9113	#9114
	Port 5	Port 6	
Port	#9115	#9116	
	Port 7	Port 8	Port 9
Port	#9117	#9118	#8111
	Port 10	Port 11	Port 12
Port	#8112	#8113	#8114

SDLC

FAC No.	FAC Code Description
	EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28
FAC 12	(NO LONGER AVAILABLE) 600 or 1200 bps (External modem)
FAC 13	Up to 9600 bps (External modem)
FAC 15	(NO LONGER AVAILABLE) 600, 1200 or 2400 bps Direct connection with clock (No modem)
FAC 16	4800 or 9600 bps Direct connection with clock (No modem)
	CCITT V.35
FAC 24	(NO LONGER AVAILABLE) Direct connection with clock (No modem) 600, 1200 or 2400 bps
FAC 25	Direct connection with clock

(No modem)
4800 or 9600 bps
FAC 26 Direct connection with clock
(No modem) 56,000 bps
FAC 27 Direct connection without clock
(No modem) 9600 bps
FAC 28 Direct connection without clock
(No modem) 56,000 bps
FAC 29 Up to 56,000
bps nonsw

CCITT X.21

FAC 30 Up to 9600 bps nonswitched
FAC 31 48,000 bps nonswitched
FAC 32 Up to 9600 bps switched
FAC 33 48,000 bps switched

FAC 12 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock - operating with external modem without clocking - and point-to-point switched 2-wire - or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1601 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9122	#9123	#9124
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
Port	Port 5	Port 6	
600 bps	#9125	#9126	
1200 bps	#9745	#9746	
	#9755	#9756	
Port	Port 7	Port 8	
600 bps	#9127	#9128	
1200 bps	#9747	#9748	
	#9757	#9758	

FAC 13 EIA RS-232/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - with external data communication equipment and clock - point-to-point switched with auto answer to 9600 bps - point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9132	#9133	#9134
LPDA	#9802	#9803	#9804
Port	Port 5	Port 6	
LPDA	#9135	#9136	
	#9805	#9806	
Port	Port 7	Port 8	
LPDA	#9137	#9138	
	#9807	#9808	

FAC 15 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Prerequisites: #1601 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9152	#9153	#9154
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
2400 bps	#9762	#9763	#9764
Selection	Port 5	Port 6	
Port	#9155	#9156	
600 bps	#9745	#9746	
1200 bps	#9755	#9756	
2400 bps	#9765	#9766	
Port	Port 7	Port 8	
600 bps	#9157	#9158	
1200 bps	#9747	#9748	
2400 bps	#9757	#9758	
	#9767	#9768	

FAC 16 EIA RS-232-C/CCITT V.24/V.28 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9162	#9163	#9164
4800 bps	#9772	#9773	#9774
9600 bps	#9782	#9783	#9784
Port	Port 5	Port 6	
4800 bps	#9165	#9166	
9600 bps	#9775	#9776	
	#9785	#9786	
Port	Port 7	Port 8	
4800 bps	#9167	#9168	
9600 bps	#9777	#9778	
	#9787	#9788	

FAC 17 EIA RS-232-C/CCITT V.24/V.28 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 40 ft. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9172	#9173	#9174
Port	Port 5	Port 6	
	#9175	#9176	
Port	Port 7	Port 8	
	#9177	#9178	

FAC 18 Integrated Modem: (NO LONGER AVAILABLE)

600 or 1200 bps - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Prerequisites: #1601 (NO LONGER AVAILABLE) and #5500 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9182	#9183	#9184
2-wire			
600 bps	#9852	#9853	#9854
1200 bps	#9862	#9863	#9864

4-wire			
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
Port	Port 5	Port 6	
2-wire	#9185	#9186	
600 bps	#9855	#9856	
1200 bps	#9865	#9866	
4-wire			
600 bps	#9745	#9746	
1200 bps	#9755	#9756	
Port	Port 7	Port 8	Port 9
2-wire	#9187	#9188	#8181
600 bps	#9857	#9858	#8851
1200 bps	#9867	#9868	#8861
4-wire			
600 bps	#9747	#9748	#8741
1200 bps	#9757	#9758	#8751
Port	Port 10	Port 11	Port 12
2-wire	#8182	#8183	#8184
600 bps	#8852	#8853	#8854
1200 bps	#8862	#8863	#8864
4-wire			
600 bps	#8742	#8743	#8744
1200 bps	#8752	#8753	#8754

(Except Japan > FAC 19 Integrated Modem: (NO LONGER AVAILABLE)

600 or 1200 bps - point-to-point switched with auto answer 2-wire. Prerequisites: #1601 (NO LONGER AVAILABLE) and #5501 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9192	#9193	#9194
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
Selection	Port 5	Port 6	
Port	#9195	#9196	
600 bps	#9745	#9746	
1200 bps	#9755	#9756	
Port	Port 7	Port 8	Port 9
600 bps	#9197	#9198	#8191
1200 bps	#9747	#9748	#8741
	#9757	#9758	#8751
Port	Port 10	Port 11	Port 12
600 bps	#8192	#8193	#8194
1200 bps	#8742	#8743	#8744
	#8752	#8753	#8754<)

FAC 24 CCITT V.35 Interface: (NO LONGER AVAILABLE)

600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1601 (NO LONGER AVAILABLE) and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9242	#9243	#9244
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
2400 bps	#9762	#9763	#9764

Selection	Port 5	Port 6	
Port	#9245	#9246	
600 bps	#9745	#9746	
1200 bps	#9755	#9756	
2400 bps	#9765	#9766	
Port	Port 7	Port 8	Port 9
600 bps	#9247	#9248	#8241
1200 bps	#9747	#9748	#8741
2400 bps	#9757	#9758	#8751
	#9767	#9768	#8761
Port	Port 10	Port 11	Port 12
600 bps	#8242	#8243	#8244
1200 bps	#8742	#8743	#8744
2400 bps	#8752	#8753	#8754
	#8762	#8763	#8764

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9252	#9253	#9254
4800 bps	#9772	#9773	#9774
9600 bps	#9782	#9783	#9784
Selection	Port 5	Port 6	
Port	#9255	#9256	
4800 bps	#9775	#9776	
9600 bps	#9785	#9786	
Port	Port 7	Port 8	Port 9
4800 bps	#9257	#9258	#8251
9600 bps	#9777	#9778	#8771
	#9787	#9788	#8781
Port	Port 10	Port 11	Port 12
4800 bps	#8252	#8253	#8254
9600 bps	#8772	#8773	#8774
	#8782	#8783	#8784

FAC 26 CCITT V.35 Interface: 56,000 bps with business machine clock - operating with no modem - and direct connection up to 1,000 ft or up to a total cable length of 200 ft to a 3705. Limitations: Mutually exclusive with FAC codes 28, 29, 31, 33 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9262	#9263	#9264
Port	Port 5	Port 6	
	#9265	#9266	
Port	Port 7	Port 8	Port 9
	#9267	#9268	#8261
Port	Port 10	Port 11	Port 12
	#8262	#8263	#8264

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection
Port

Port 2
#9272

Port 3
#9273

Port 4
#9274

Port

Port 10
#8302

Port 11
#8303

Port 12
#8304

Port

Port 5
#9275

Port 6
#9276

FAC 31 CCITT X.21 Interface: 48,000 bps without business machine clock and point-to-point or multipoint nonswitched operation. Limitations: Mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

Port

Port 7
#9277

Port 8
#9278

Port 9
#8271

Port

Port 10
#8272

Port 11
#8273

Port 12
#8274

FAC 28 CCITT V.35 Interface: 56,000 bps without business machine clock - operating with no modem - and direct connection up to 1,000 ft to another 8100 System (with business machine clock). Limitations: Mutually exclusive with FAC codes 26, 29, 31, 33 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection
Port

Port 2
#9312

Port 3
#9313

Port 4
#9314

Port

Port 5
#9315

Port 6
#9316

Port

Port 7
#9317

Port 8
#9318

Port 9
#8311

FAC Specify
Selection
Port

Port 2
#9282

Port 3
#9283

Port 4
#9284

Port

Port 10
#8312

Port 11
#8313

Port 12
#8314

Port

Port 5
#9285

Port 6
#9286

FAC 32 CCITT X.21 Interface: Up to 9600 bps without business machine clock and switched with auto answer and auto call. Prerequisites: #1602 and #5656. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

Port

Port 7
#9287

Port 8
#9288

Port 9
#8281

FAC Specify
Selection
Port

Port 2
#9322

Port 3
#9323

Port 4
#9324

Port

Port 5
#9325

Port 6
#9326

Port

Port 7
#9327

Port 8
#9328

Port 9
#8321

Port

Port 10
#8322

Port 11
#8323

Port 12
#8324

FAC 29 CCITT V.35 Interface: Up to 56,000 bps without business machines clock and external data communication equipment with clock, and point-to-point or multipoint nonswitched. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 31, 33 or two FAC codes 08, 09. Maximum: For operation at speeds greater than 9600 bps, one per 8140 or one per 8140/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection
Port

Port 2
#9292

Port 3
#9293

Port 4
#9294

Port

Port 5
#9295

Port 6
#9296

FAC Specify
Selection
Port

Port 2
#9332

Port 3
#9333

Port 4
#9334

Port

Port 7
#9297

Port 8
#9298

Port 9
#8291

Port

Port 5
#9335

Port 6
#9336

Port

Port 10
#8292

Port 11
#8293

Port 12
#8294

Port

Port 7
#9337

Port 8
#9338

Port 9
#8331

Port

Port 10
#8332

Port 11
#8333

Port 12
#8334

FAC 30 CCITT X.21 Interface: Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify
Selection
Port

Port 2
#9302

Port 3
#9303

Port 4
#9304

Port

Port 5
#9305

Port 6
#9306

BSC

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28/CCITT
X.21bis/V.28

Port

Port 7
#9307

Port 8
#9308

Port 9
#8301

FAC 40* 600 or 1200 bps (External modem)
FAC 41* Up to 9600 bps (External modem)
FAC 44* 2400, 4800 or 9600 bps direct

MACHINES

connection with clock (No modem)

Integrated Modem

FAC 45* 600 or 1200 bps nonswitched

| **FAC 40 EIA RS-232-C/CCITT V.24/V.28 Interface:** (NO LONGER AVAILABLE)

600 or 1200 bps with business machine clock - operating with external modem with no clock - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9402	#9403	#9404
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6
Port	#9405	#9406
600 bps	#9745	#9746
1200 bps	#9755	#9756

	Port 7	Port 8
Port	#9407	#9408
600 bps	#9747	#9748
1200 bps	#9757	#9758

| **FAC 41 EIA RS-232-C/CCITT V.24/V.28 X.21bis/V.28 Interface:** (NO LONGER AVAILABLE)

Up to 9600 bps without business machine clock - operating with external data communication equipment - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9412	#9413	#9414

	Port 5	Port 6
Port	#9415	#9416

	Port 7	Port 8
Port	#9417	#9418

| **FAC 44 EIA RS-232-C/CCITT V.24/V.28 Interface:** (NO LONGER AVAILABLE)

2400, 4800 or 9600 bps with business machine clock - operating with no modem (attached downstream terminal must not provide business machine clock) - and direct connection up to 40 ft. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1604 (NO LONGER AVAILABLE), #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
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Port	#9442	#9443	#9444
2400 bps	#9762	#9763	#9764
4800 bps	#9772	#9773	#9774
9600 bps	#9782	#9783	#9784

	Port 5	Port 6
Port	#9445	#9446
2400 bps	#9765	#9766
4800 bps	#9775	#9776
9600 bps	#9785	#9786

	Port 7	Port 8
Port	#9447	#9448
2400 bps	#9767	#9768
4800 bps	#9777	#9778
9600 bps	#9787	#9788

| **FAC 45 Integrated Modem:** (NO LONGER AVAILABLE)

600 or 1200 bps - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 (NO LONGER AVAILABLE) or 46 (NO LONGER AVAILABLE) on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature, #3220 (NO LONGER AVAILABLE). Prerequisites: #1603 (NO LONGER AVAILABLE) and #5500 (NO LONGER AVAILABLE). Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9452	#9453	#9454
2-wire			
600 bps	#9852	#9853	#9854
1200 bps	#9862	#9863	#9864
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6
Port	#9455	#9456
2-wire		
600 bps	#9855	#9856
1200 bps	#9865	#9866
4-wire		
600 bps	#9745	#9746
1200 bps	#9755	#9756

	Port 7	Port 8	Port 9
Port	#9457	#9458	#8451
2-wire			
600 bps	#9857	#9858	#8851
1200 bps	#9867	#9868	#8861
4-wire			
600 bps	#9747	#9748	#8741
1200 bps	#9757	#9758	#8751

	Port 10	Port 11	Port 12
Port	#8452	#8453	#8454
2-wire			
600 bps	#8852	#8853	#8854
1200 bps	#8862	#8863	#8864
4-wire			
600 bps	#8742	#8743	#8744
1200 bps	#8752	#8753	#8754

START/STOP

FAC No.	FAC Code	Description

EIA RS-232-C/CCITT V.24/V.28		

FAC 60* 110, 134.5, 150, 300 or

600 bps (External modem)
FAC 61* 110, 134.5, 150, 300 or
600 bps Direct connection with
clock (No modem)

(* NO LONGER AVAILABLE)

FAC 60 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

110, 134.5, 150, 300 and 600 bps with business machine clock - operating with external modem - and point-to-point nonswitched facilities. See M2700 pages for specific information on communication facilities and other attachment information. Prerequisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9602	#9603	#9604
110 bps	#9702	#9703	#9704
134.5 bps	#9712	#9713	#9714
150 bps	#9722	#9723	#9724
300 bps	#9732	#9733	#9734
600 bps	#9742	#9743	#9744

	Port 5	Port 6
Port	#9605	#9606
110 bps	#9705	#9706
134.5 bps	#9715	#9716
150 bps	#9725	#9726
300 bps	#9735	#9736
600 bps	#9745	#9746

	Port 7	Port 8
Port	#9607	#9608
110 bps	#9707	#9708
134.5 bps	#9717	#9718
150 bps	#9727	#9728
300 bps	#9737	#9738
600 bps	#9747	#9748

FAC 61 EIA RS-232-C/CCITT V.24/V.28 Interface: (NO LONGER AVAILABLE)

110, 134.5, 150, 300 and 600 bps with business machine clock - operating with no modem (the attached terminal must provide its own business machine clock) - and direct connection up to 40 ft. Pre-

requisites: #1603 (NO LONGER AVAILABLE) and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9612	#9613	#9614
110 bps	#9702	#9703	#9704
134.5 bps	#9712	#9713	#9714
150 bps	#9722	#9723	#9724
300 bps	#9732	#9733	#9734
600 bps	#9742	#9743	#9744

Selection	Port 5	Port 6
Port	#9615	#9616
110 bps	#9705	#9706
134.5 bps	#9715	#9716
150 bps	#9725	#9726
300 bps	#9735	#9736
600 bps	#9745	#9746

	Port 7	Port 8
Port	#9617	#9618
110 bps	#9707	#9708
134.5 bps	#9717	#9718
150 bps	#9727	#9728
300 bps	#9737	#9738
600 bps	#9747	#9748

DEVICE ATTACHMENT

Direct Attached Devices: The following devices can attach directly to the processor:

- 3277 Display Station Models 1, 2
- 3284 Printer Models 1, 2
- 3286 Printer Models 1, 2
- 3287 Printer Models 1, 2
- 3288 Line Printer Model 2
- 3732 Text Display Station
- 3736 Printer
- 8101, 8102 Storage and I/O Unit
- 8809 Magnetic Tape Unit

Loop-Attached Devices: The following devices can attach to a direct-attached loop or to a data link-attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

Device and Model	Loop Attachment		Data Link At 2400, 4800, 9600 bps
	Direct 9600 bps	At 38400 bps	
3104 Display Terminal B1, B2	X	X	X
3230 Printer 1	X	X	X
3232 Keyboard Printer Terminal Model 11	X	X	X
3262 Printer 2, 12	(1)	X	(1)
3268 Printer 1	X	X	X
3274 Control Unit 51C, 61C with:	X	X	X
- 3179 Color Display Station Model 1			
- 3179 Color Graphics Display Station Model G1, G2			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 3, 13			
- 3268 Printer 2			
- 3278 Display Station 1, 2, 3, 4, 5			

- 3279 Color Display Unit 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3274 Control Unit 52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3268 Printer 2			
- 3278 Display Station 1, 2, 52			
- 3283 Printer 52			
- 3287 Printer 1,2			
3276 Control Unit Display Station 11,12,13,14 with:	X		X
- 3178 Display Station			
- 3179 Color Display Station			
- 3180 Display Station 1 (available only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4			
- 3279 Color Display 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3287 Printer 11, 12	X	X	X
3289 Printer 3 with:	(1)		(1)
- 2502 Card Reader A1*			
- 3501 Card Reader			
- 3521 Carder Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting Terminal 1,	X		X
3642 Encoder Printer 1,2	X		X
3643 Keyboard Display 2,3,4	X		X
3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance Terminal	X		X
4701 Finance Comm Controller Model 1,2	X	X	X
5210 E01,E02	X		
7426 Terminal Interface Unit 1, w/ associated terminals	X	X	X
8775 Display Terminal 1,2	X	X	X

(1) Dedication of a 9600 bps single-lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data, see the M2700 pages and appropriate machine pages for additional information.

Refer to the "IBM Information System Configurator", GA27-2876, for selection of 8100 FAC codes.

Devices conforming to TTY 33/35 or equivalent

2741 Communication Terminal

Terminals conforming to 2780/3780 line protocol

3101 Display Terminal Models 10, 12, 13

3161 Display Station Model 11, 12

3163 Display Station Model 11, 12

3232 Keyboard Printer Model 1

3274 Control Unit Model 51C, 61C with:

- 3178 Display Station
- 3179 Color Display Station Model 1
- 3179 Color Graphics Display Station Model G1, G2
- 3180 Display Station 1 (available only when emulating a 3278)
- 3230 Printer Model 2
- 3262 Printer Models 3, 13
- 3268 Printer 2
- 3278 Display Station Models 1, 2, 3, 4, 5
- 3279 Color Display Station Models 2A, 2B, 3A, 3B
- 3287 Printer Models 1, 2, 1C, 2C

- 3289 Line Printer Models 1,2

3274 Control Unit Model 52C with:

- 3178 Display Station
- 3180 Display Station Model 1 (available only when emulating a 3278)
- 3268 Printer 2
- 3278 Display Station Models 1, 2, 52
- 3283 Printer Model 52
- 3287 Printer Models 1, 2
- 3276 Control Unit Display Station Models 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: (*These Models are supported in SDLC mode.)
- 3178 Display Station
- 3179 Color Display Station (not supported on 3276 Model 1)
- 180 Display Station Model 1 (available only when emulating a 3278)
- 3230 Printer Model 2
- 3262 Printer Model 13
- 3268 Printer 2
- 3278 Display Station Models 1, 2, 3, 4 (See M3276 for configuration details.)
- 3279 Color Display Station Models 2A, 2B, 3A, 3B (Not supported on 3276 Models 1, 2, 3, 4)
- 3287 Printer Models 1, 2, 1C, 2C
- 3289 Line Printer Models 1, 2

3600 Finance Communication Controllers

3630 Plant Communication Controllers

3651 Store Controllers Models 25, 75

3684 Point of Sale Control Unit Models 1, 2

3767 Communication Terminal Models 1, 2, 3

3842 Loop Control Unit

3843 Loop Control Unit
4700 Finance Communication Controllers
4952,4954,4955,4959 Processor (series/1)
(Canada only > 5150 IBM Personal Computer <)
5285,5288 Programmable Data Stations
6360,6580 Displaywriter (3270 DSC Mode only)
6670 Information Distributor Models 1, 2
8101 Storage and I/O Unit
8130 Processor
8140 Processor
8150 Processor
7426 Terminal Interface Unit Model 2, with associated terminals

8775 Display Terminal Models 11, 12

Direct Connection Attachment: In addition to terminal attachment to 8100 System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The direct connect is made by using SDLC (FAC 15*, 16, 17, 24*, 25, 27 or 28), BSC (FAC 44*) and Start/Stop (FAC 61*).(* NO LONGER AVAILABLE). Shown below are the direct connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct connect cables.

DIRECT CONNECTION ATTACHABLE DEVICES

Attaching Device	Speeds bps	Attaching Device Feature No.	8100 FAC CODE
2741	134.5	#9114** and #3255**	61**
Devices Conforming to 2780/3780 Line Protocol	2400,4800,9600	Refer to specific device	44**
3101,3161,3163	110,150,300,600	None required	61**
3232-1	1200,2400	None	15**
	4800,9600	None	16
3274-51C,61C	1200,2400	#3701 and #6302**	15**
	4800,9600	#3701 and #6302**	16
	1200,2400	#1550 and #6302**	24**
	4800,9600	#1550 and #6302**	25
	56,000	#1550 and #6303**	26
3276	600,1200,2400	#3701 w #9491** and #6302**	15**
	4800,9600	#3701 w #9491** and #6302**	16
3651-25/75	4800	#2827**	16*
3705-II	600,1200,2400	#4714**	15**
	4800,9600	#4714**	16
	56,000	#2944**	26
3705-80	600,1200,2400	None	15**
	4800,9600	None	16
	56,000	#6712**	26
3725	600,1200,2400	#4911**	15**
	4800,9600	#4911**	16
3767	600,1200,2400	#3718** w #9707** and #9533**	15**
4701	1200,2400	None	15**
	4800,9600	None	16
4952,4954,4955,4959	1200,2400	#2090**	15**
	4800,9600	#2090**	16
6360	1200,2400,2400	#3707**	15**
	4800,9600	#3707**	16
6580-AO4,BO4	1200,2400	#3705**	15**
	4800,9600	#3705**	16
6670-1,2	600,1200,2400	#9420**	15**
	4800	#9420**	16
6670-2	9600	#9420**	16
7426-2	600,1200,2400	None	15**
	4800,9600	None	16
8101,8130,8140-AXX,BXX	600,1200,2400	FAC 17 (see Note)	15**
	600,1200,2400	FAC 27 (see Note)	24**
	4800,9600	FAC 17 (see Note)	16
	4800,9600	FAC 27 (see Note)	25
8140-CXX	4800	#1621 and #9688** (see Note)	16
8101	56,000	FAC 28 (see Note)	26
8140-BXX			
8140-CXX	56,000	#1614 and #9683** (see Note)	26
8150	4800,9600	#1733** and #9688** or #1734** and #9698** (see Note)	16

MACHINES

	56,000	#1742** and #9682** or #1745** and #9693** (see Note)	26
8775	600,1200,2400	#3701	15**
	4800,9600	#3701	16
	600,1200,2400	#1550	24**
	4800,9600	#1550	25

Note: FAC 17, 27 or 28 in the attaching 8101, 8130, 8140-AXX, BXX or #1614, #1621 on 8140 Model C, or 8150 with #1733**, #1734**, #1742** or #1745 without business machine clock.

*Specify #9770 is available to facilitate problem determination.

I ** NO LONGER AVAILABLE

Table 5-Selected Configurations

8140 Mdl B51, B52, B61, B62, B71, B72
Selected Configuration Codes

Selected
Configuration
Feature
Code

Quantity-Component	Feature Code
#1002	3-#1602, 1-#3701, 2-#4830, 1-#9082, 1-#9103, 1-#9134
#1003	4-#1602, 1-#1701, 1-#3701, 1-#3901, 3-#4830, 1-#9082, 1-#9103, 1-#9107, 1-#9134
#1004	3-#1602, 1-#1701, 2-#3701, 1-#3901, 1-#4830, 1-#9082, 1-#9134, 1-#9135
#1005	4-#1602, 1-#1701, 2-#3701, 1-#3901, 2-#4830, 1-#9082,

	1-#9103, 1-#9134, 1-#9135
#1006	5-#1602, 1-#1701, 2-#3701, 1-#3901, 3-#4830, 1-#9082, 1-#9103, 1-#9107, 1-#9134, 1-#9135
#1008	3-#1602, 1-#3701, 2-#4830, 1-#9102, 1-#9103, 1-#9134
#1009	3-#1602, 1-#1701, 2-#3701, 1-#3901, 1-#4830, 1-#9103, 1-#9134, 1-#9135
#1010	4-#1602, 1-#1701, 3-#3701, 1-#3901, 1-#4830, 1-#9103, 1-#9134, 1-#9135, 1-#9136
#1011	6-#1602, 1-#1701, 4-#3701, 1-#3901, 2-#4830, 1-#9082, 1-#9103, 1-#9134, 1-#9135, 1-#9136, 1-#9138

Note: Only the appropriate codes listed below may be specified in addition to the Selected Configuration code.

Power/Plug: #9884, #9894.

6-ft Cable: #9986

3640 Attachment: #9800

Programming Configuration: #9700, #9710, #9720, #9730

Floating Point: #3750

8140 PROCESSOR MODELS C72, C82, C92

(NO LONGER AVAILABLE)

PURPOSE

The 8140 Processor provides control, storage, processing capability, disk and diskette storage, and device or communication attachment capabilities for the 8100 Information System.

MODELS C72, C82, C92

Model	Base Processor Storage (bytes)	Non-Removable Disk Capacity (bytes)	Fixed Head Capacity (bytes)
C72	1024K (1,048,576)	123MB (123,174,192)	131,072
C82	1536K (1,572,864)	123MB (123,174,192)	131,072
C92	2048K (2,097,152)	123MB (123,174,192)	131,072

Maximum: One per 8100 Information System.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8140 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8140 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions. Optional instructions are available for floating point arithmetic. Eight I/O interrupt levels provide for interrupt processing. The 8140 C Models offer three processor storage sizes. Depending on the Model of the processor selected, processor storage can be up to a maximum of 2048K (2,097,152) bytes. Capability for dynamic addressing and storage protection for up to 16 million bytes of logical storage is available. The 8140 Processor Models C72, C82 and C92 storage makes use of the Error Correction Code (ECC) to provide single-error and double-error detection capability.

The 8140 Models C72, C82 and C92 allow for the attachment of up to four 8101 or 8102 Storage and I/O Units, or three 8101 or 8102 Storage and I/O Units and one 8809 Magnetic Tape Unit Model 1B. An alternate configuration can consist of an 8140, four 8101 or 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit Model 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit Model 1A or 1B.

The 8140 C Models Processor is provided with fixed high-speed direct access disk storage of 123 million bytes (consisting of two volumes) with movable and fixed heads. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds. Removable diskette storage is provided with up to 1MB (985,088 bytes) of storage operating at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370, 4341, 4381, or 9370 Processor via the 3704, 3705, 3720 or 3725 for SNA/SDLC or BSC line control. The 8100 System can attach to the communications adapter of the 4331, 4361, or 9370 Processor for SDLC or BSC line control. For specific attachment, see M2700 pages.

The capability of the 8100 Information System is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8140 via communication port features which include data link, direct connect, and loops that are direct-attached or data link-attached. Up to ten communication and loop ports can be configured in the 8140 Models C72, C82 and C92.

Physical security is provided through the use of keylocks on the operator panel, diskette drive and machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8140 Processor is designated as a customer setup unit, thereby offering the customer early availability and re-location flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8140. Customer setup instructions will be shipped with each machine. An 8140 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An "8100 Information System Maintenance Manual" SY27-2521, should be requested by the 8100 servicing organization.

Performance: The maximum number of communication and loop ports configured and capable of concurrent operation is a function of the speed of the line, communication facilities, the operating system installed and the application work load. The maximum number of communications and loop ports which can be physically installed can exceed the operational capability.

Multiple High-Speed Adapters: The 8140 C Models have the physical capability for four (high-speed) communication ports in excess of 9600 bps. The maximum number of high-speed ports activated concurrently is limited to two.

- Two loops at 38,400 bps, or
- One loop at 38,400 bps and one SDLC data link at a speed greater than 9600 bps.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System publications require DPPX or DPCX. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the "Functional Definition Manual 8100" which will be available from Mechanicsburg at FCS.

Communications And Loops: The communication and loop attachments are available in line sets which occupy pre-defined ports. There are five sets of which one can occupy Ports 1-4, four sets of which one can occupy Ports 5-8 and one set for Ports 9 and 10. A maximum of ten ports are available. If a line set is selected for Ports 1-4, there can be no high-speed (greater than 9600 bps) ports in an attached 8101 storage and I/O unit. Conversely, if there are no line sets selected for Ports 1-4, then the 8101 may contain high-speed ports (maximum two).

The speed of the loops in communication ports features #1610-#1614 are manually switch-selectable at customer setup time at either 9600 bps or 38,400 bps. The limitation on the total number of active ports at greater than 9600 bps is two. In an 8100 System, only ten Loop or SDLC communication ports may be active at one time.

Note: With a given Communication Ports Feature the selected option LPDA can be changed in the field by the CE. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a Communication Ports Feature and its associated specify code must identify the original codes ordered from the factory, processors or devices.

Publications: GC20-8100.

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

- Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
200V #2806	200V #2732
220V #2813	208V #9902
230V #2821	220V #2803
240V #2801	240V #2831

The power cable shipped with each machine will be 4.3m (14 ft) long.

Frequency conversion between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200 V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

- (Japan only> Specify #9890 for locking plug, #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated.<)

Note: (Except Japan>The 3-digit Country Code on the DP Machine Order Sheet will be used to select a power plug which matches the most commonly used power supply in the country.<)

- Color: Pebble gray is the only available color.
- Machine Nomenclature:

Brazilian (Portuguese)	#2933
Canadian French	#2935
English US	#2924
Spanish	#2931

- Relocation: If the user relocates and/or interchanges an attaching 8101 from one 8100 System to another, the user must consider address compatibility of the processor and its attachments. For further information, see "IBM 8100 Information System Site Planning Guide", GA27-2884. For relocation/replace Kit Ordering, see "Relocate/Replace: 8100 System" under "Accessories".
- Upending: In the event the 8140 must be placed on end to maneuver to the installation site, specify #9840. For additional ordering information associated with #9840, see Accessories "Upending Feature, 8140". Field Installation: Yes.
- Cabling: For loop cabling information, see "Accessories" and the "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.
- Programming Configuration: Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations. Field Installation: Yes.
- 8101/8102 Attachment: Order #9939 for the first 8102 being attached to any Model 8130 or 8140 processor. If the 8102 has feature # 4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and

secondary processors. This specify code supplies updated maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.

- Industrial Automations specify:

- Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

- I Display and Printer, Additional (#1506): (NO LONGER AVAILABLE)

Provides for the attachment of additional 3277 Displays, 3284, 3286, 3287 and 3288 Printers in any combination up to four. Maximum: Five. Field Installation: Yes. Prerequisites: #3220 (NO LONGER AVAILABLE).

- I Display and Printer Attachment (#3220): (NO LONGER AVAILABLE)

Provides for the attachment of 3277 Displays, 3284, 3286, 3287 and 3288 Printers in any combination up to four. Can be expanded to a maximum of 24 devices with Display and Printer, additional #1506 (NO LONGER AVAILABLE). Limitations: Not available with #4901 or #1630 (see Table 1 for further information). Maximum: One per 8140. Field Installation: Yes. Prerequisites: #3901 when ordered without #1620, #1621, #1622 (NO LONGER AVAILABLE), or #1623 (NO LONGER AVAILABLE).

- I Floating Point Feature (#3750): (NO LONGER AVAILABLE)

Provides for execution of 30 floating point instructions and 32 floating point registers to improve performance of floating point operations. The instructions provide for loading, adding, subtracting, comparing, multiplying, dividing, storing and controlling the sign of short (4-byte) operands and long (8-byte) operands. Maximum: One. Field Installation: Yes.

Feature Expansion Prerequisite (#3901): Required for communication ports feature #1620, #1621, #1622 (NO LONGER AVAILABLE), or #1623 (NO LONGER AVAILABLE) or Display and Printer Attachment, #3220 (NO LONGER AVAILABLE), without communication ports feature #1620, #1621, #1622 (NO LONGER AVAILABLE) or #1623 (NO LONGER AVAILABLE) or Magnetic Tape Attachment (#4901) without communication ports feature #1620, #1621 #1622 (NO LONGER AVAILABLE), or #1623 (NO LONGER AVAILABLE). See Table 1. Maximum: One. Field Installation: Yes. Prerequisites: #1620, #1621, #1622 (NO LONGER AVAILABLE), or #1623 (NO LONGER AVAILABLE) --- #3220 (NO LONGER AVAILABLE) or #4901 without #1620, #1621, #1622 (NO LONGER AVAILABLE) or #1623 (NO LONGER AVAILABLE).

Magnetic Tape Attachment (#4901): Provides for the attachment of up to four 8809 Magnetic Tape Units, consisting of one 8809 Model 1A plus two model 2s and one model 3. Limitations: Not available if the 8101 or 8102 Storage and I/O Unit has the 8809 Magnetic Tape Unit Model 1A attached (#4521) or if 8809 Model 1B is attached to the 8140 model C72, C82 or C92 Processor. Also not available with Communication Ports Feature (#1630) or Display and Printer Attachment, #3220 (NO LONGER AVAILABLE). See Table 1 for further information. Maximum: One. Field Installation: Yes. Prerequisites: #3901 when ordered without #1620, #1621, #1622 (NO LONGER AVAILABLE), or #1623 (NO LONGER AVAILABLE).

Table 1

When configuring the 8140 C Models for communication port features for Ports 5-10, Display and Printer Attachment, and Magnetic Tape Attachment, the table below shows the combination of these features that may be configured.

#3901 plus: #1620, #1621, #1622 (NO LONGER AVAILABLE) or #1623 (NO LONGER AVAILABLE), or #3220 (NO LONGER AVAILABLE) or #4901

or
#3901 plus: #1620, #1621, #1622 (NO LONGER AVAILABLE) or #1623 (NO LONGER AVAILABLE)
plus: #1630, #3220 (NO LONGER AVAILABLE) or #4901

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	Sys* Max	System Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

Communication Ports Feature (#1610): Two directly attached loops and two SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides for loop attachment in Ports 1 and 2 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Ports 3 and 4 provide a communication interface without clock to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9803 for port 3 and #9804 for port 4. Limitations: Not available with #1611, #1612, #1613 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Maximum: One. Field Installation: Yes. Specify: Modems.

Special Feature	Port Position			
	1	2	3	4
#1610	Direct-Attach Loop	Direct-Attach Loop	SDLC/EIA/CCITT	SDLC/EIA/CCITT

Communication Ports Feature (#1611): Three directly-attached loops and one SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides communication interface without clock to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9804 for port 4. Limitations: Not available with #1610, #1612, #1613 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Only two loops may be activated concurrently at 38,400 bps. Maximum: One. Field Installation: Yes. Specify: Modems.

Special Feature	Port Position			
	1	2	3	4
#1611	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/EIA/CCITT

Communication Ports Feature (#1612): Three Loops and one SDLC/CCITT X.21 Switched interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides SDLC/CCITT X.21 switched interface without clock up to 48,000 bps -- with auto answer and auto call -- via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287. Limitations: Not available with #1610, #1611, #1613 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Either two loops at 38,400 bps, or one loop at 38,400 bps and the X.21 port at greater than 9600 bps may be activated concurrently. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1612	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/X.21 NonSw

Communication Ports Feature (#1613): Three Loops and one SDLC/CCITT X.21 nonswitched interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides SDLC/CCITT X.21 non-switched interface without clock up to 48,000 bps-point-to-point or multipoint-via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287. Limitations: Not available with #1610, #1611, #1612 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Either two loops at 38,400 bps, or one loop at 38,400 bps and the X.21 port at greater than 9600 bps may be activated concurrently. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1613	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/X.21 NonSw

Communication Ports Feature (#1614): Three Loops and one SDLC/CCITT V.35 interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides SDLC/CCITT V.35 interface without clock up to 56,000 bps to external modem with clock, or direct-connect with or without clock at 56,000 bps up to 1,000 ft or up to a total cable length of 200 ft to a 3705. Specify code #9684 for external modem, #9683 for direct-connect without clock, or #9682 with prerequisite multi-speed clock (#5200), for direct-connect with clock at 56,000 bps. Limitations: Not available with #1610, #1611, #1612 or #1613. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Either two loops at 38,400 bps, or one loop at 38,400 bps and the CCITT V.35 port at greater than 9600 bps may be

activated concurrently. Maximum: One. Field Installation: Yes. Specify: Modems.

Special Feature	Port Position			
	1	2	3	4
#1614	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/V.35

Communication Ports Feature (#1620): One Low-Speed Loop and three SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides for loop attachment in Port 7 operating at 9600 bps. Port 7 may be a two-lobe loop with the addition of #4835 and specify code #9874. Ports 5, 6 and 8 provide a communication interface without clock to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9805 for port 5, #9806 for port 6 and #9808 for port 8. Limitations: Not available with #1621. Maximum: One. Field Installation: Yes. Prerequisites: #3901. Specify: Modems.

Special Feature	Port Position			
	5	6	7	8
#1620	SDLC/EIA/CCITT	SDLC/EIA/CCITT	Direct-Attach Loop	SDLC/EIA/CCITT

Communication Ports Feature (#1621): Four SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides communication interfaces in Ports 5-8. Ports 6, 7 and 8 are unclocked and attach to external modems with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Port 5 provides the same interface as Ports 6, 7 and 8, or direct connect at 4800 and 9600 bps up to 40 ft for Port 5. Specify code #9686 for 4800 bps or #9687 for 9600 bps with prerequisite multi-speed clock (#5200) for direct-connect with clock #9688 for direct-connect without clock; #9689 for external modem without LPDA; or #9805 for external modem with LPDA. Specify codes #9805, #9686, #9688, and #9689 are mutually exclusive. If LPDA is required for ports 6, 7 or 8, specify #9806 for port 6, #9807 for port 7, and #9808 for port 8. Limitations: Not available with #1620. Maximum: One. Field Installation: Yes. Prerequisites: #3901. Specify: Modems.

Special Feature	Port Position			
	5	6	7	8
#1621	SDLC/EIA/CCITT	SDLC/EIA/CCITT	SDLC/EIA/CCITT	SDLC/EIA/CCITT

Communication Ports Feature (#1622): (NO LONGER AVAILABLE)

One SDLC and three BSC EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 interfaces. Provides IBM microcode control for BSC communication interfaces in ports 5, 6, and 8 from 1200 to 9600 bps without clock or 600 and 1200 bps with clock to external DCE point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Port 5 also provides for direct-connect up to 40 ft. User parameter-selectable business machine clock options and speed at 1200, 1800, 3600, 4800, 7200 and 9600 bps are available. The attached terminal must not provide business machine clocking.

Specify code #9690 for direct-connect with clock. The SDLC port 7 provides a communication interface without clock to an external DCE with clock to 9600 bps point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9807 for port 7. Limitations: Not available with #1620, #1621, or #1623 (NO LONGER AVAILABLE). Mutually exclusive with 8101 BSC FAC codes 40*, 41*, 44*, 45* (NO LONGER AVAILABLE) on an 8100 system. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Special Feature	Port Position			
	5	6	7	8
#1622	BSC/EIA/CCITT	BSC/EIA/CCITT	SDLC/EIA/CCITT	BSC/EIA/CCITT

Communication Port Feature (#1623): (NO LONGER AVAILABLE)

Two BSC EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 interfaces. Provides IBM microcode control for BSC communication interfaces in ports 5 and 6 from 1200 to 9600 bps without clock or 600 and 1200 bps with clock to an external DCE point-to-point nonswitched 2- or 4-wire or multipoint nonswitched 4-wire. Limitations: Not available with #1620, #1621, or #1622 (NO LONGER AVAILABLE). Mutually exclusive with 8101 BSC FAC codes 40*, 41*, 44*, 45* (* NO LONGER AVAILABLE) on an 8100 system. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Special Feature	Port Position	
	5	6
#1623	BSC/EIA/CCITT	BSC/EIA/CCITT

Communication Ports Feature (#1630): Two SDLC/EIA interfaces. Provides for SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interface without clock to external modem, with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire in Ports 9 and 10. If LPDA is required, specify #8801 for port 9, and #8802 for port 10. Limitations: Not available with #3220 (NO LONGER AVAILABLE) or #4901. Maximum: One. Field Installation: Yes. Prerequisites: #1620, #1621, #1622 (NO LONGER AVAILABLE) or #1623 (NO LONGER AVAILABLE).

Special Feature	Port Position	
	9	10
#1630	SDLC/EIA/CCITT	SDLC/EIA/CCITT

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: Two. One for Port 2 and one for Port 7. Maximum is four per 8100 System. Field Installation: Yes. Prerequisites: #1610, #1611, #1612, #1613, #1614 or #1620. Specify: Code #9873 for Port 2 in Communication Ports Features #1610 through #1614 and #9874 for Port 7 in Communication Ports Feature #1620.

Multi-Speed Clock (#5200): Provides business machine clocking at 56,000 bps for direct-connect in Port 4 of Communication Ports Feature #1614 or business machine clocking at 4800 bps for Port 5 of Communication Ports Feature #1621. One must be ordered for each clocked port. Maximum: Two per 8140 Model C72, C82 or C92. Field Installation: Yes. Prerequisites: #1614 or #1621.

MODEL CONVERSIONS

(NO LONGER AVAILABLE)

The following Model changes can be field installed:

To	C72	C82	C92
From			
B52*	X	X	X
B62*	X	X	X
B72*	X	X	X
C72		X	X
C82			X

* For 8140 B Model upgrades, order a preparation MES for steps 1 to 3 if required, and then order the upgrade MES for all items in step 4.

1. 8140 Model BX1 without #4545 (NO LONGER AVAILABLE) expanded function panel, order MES for: Model change to 8140 Model BX2.
2. 8140 Model BX1 with #4545 (NO LONGER AVAILABLE) expanded function panel, order MES for: Remove #4545 (NO LONGER AVAILABLE) and Model change to 8140 Model BX2.
3. 8140 Model BX2 with #4545 (NO LONGER AVAILABLE) expanded function panel, order MES for: Remove #4545 (NO LONGER AVAILABLE).
4. 8140 Model BX2, order MES for: Mdl change to 8140 C Model --- removing all 8140 B Model communication- and loop-associated feature codes and specify codes --- adding 8140 C Model communication port and loop features as required. (Canada only > For 8140 B Models with 208V AC power -- remove specify code #9884 and add #9902 --- with 240V AC power -- remove #9894 and add #2831. In addition, remove #9886 for 1.8m (6 ft) cable.<)

The 8140 Model B72 to C72 upgrade has a purchase price and can be ordered via standard MES. If the 8140 B72 to C72 upgrade customer requires communication ports or loop feature changes, a companion RPQ for such must accompany the upgrade MES.

Upgrades from 8140 BXX to B72 and C72 to CXX have purchase price and may be ordered via standard MES.

Additional communications cables may be required when converting 8140 Model B to Model C. For communication cable information, see the "8100 Information System Site Planning Guide", GA27-2884.

BSC, Start/Stop, integrated modems, PSNA communications features are not available in the 8140 Models C72, C82, C92.

ACCESSORIES

CABLES - LOOP

Loop cables can be purchased from IBM or a customer-selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

- Other Loop Cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multi-use Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
- Indoor Cable P/N 1657265: UL-approved (style 2919) for interconnection of low voltage electronic equipment. Maximum allowable cable temperature range is -34C to +80C.
- Indoor Cable P/N 7838694: UL-approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34C to +90C.
- Indoor Cable P/N 7838695: UL-approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34C to +105C.
- Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34C to +80C.
- Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34C to +80C.
- Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft).

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft.). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8m (1,000 ft.).

Exterior cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3000 ft), by specifying the length wanted.) Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to IBM Cabling System - Planning and Installation Guide. For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multi-use Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached: it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

2 X 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard

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outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called 'radials'. The point where a radial line terminates at the LWC is called an LWC 'port'. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer-supplied volt-ohm meter, capable of reading 0.5 ohms and rated at least 5,000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohm meter to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

Order via MES from Raleigh:

- 1657300, Loop Splice Plate (LSP) (indoor)
- 1657310, Loop Station Connector(Radial LSC)
- 1657320, Loop Station Connector(Wrap LSC)
- 1657260, Loop Station Connector Gasket
- 1657330, Loop Wiring Concentrator (LWC)
- 1657332, LWC Circuit Board Assy (order instead of LWC-1657330)*
- 1657350, Loop Surge Suppressor (LSS)
- 1657354, LSS Circuit Board Assy (order instead of LSS-1657350)*
- 1657420, Continuity and Relay Tester
- 1657325, Wrap Switch Access Cover
- 1657379, Loop Accessory Keys(10 spares)**
- 7838771, 2 x 4 Adapter Plate (2AP)

Order via MES from Fujisawa:

- 2102151, Conventional Box (indoor) 5 x 10cm - (2 x 4 inches)
- 2100264, Clamp (for cable to indoor box)
- 1657280, Environmental Box (outdoor) 7x11.5cm - (2.75x4.5 inches) (For industrial use)
- 2114285, Environmental Clamp - small (for indoor cable to environmental box)
- 1657377, Environmental Clamp - large (for outdoor cable to environmental box)
- 1657292, Metric Conduit Adapter

- 1657305, Environmental Enclosure - NEMA - 4X 36x30x15cm (14x12x6 in.)
- 1657306, Environmental Enclosure Mtg Pnl
- 1657307, Sealing - Locknut

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** One package (10 keys) shipped with each 8101 or 8140. One key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use Machine type 8101 or 8140.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments. However, see local CE management and GI section 65 for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuse Communications Loop Planning and Installation Guide", (GA27-3341) for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the Branch Office.

To enable a customer to test his installed loops, it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

Relocate/Replace Kits: (Except French Canadian and Spanish) The material required to perform machine relocation or processor replacement has been grouped into machine type dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8140 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	4448550	4448551	N/A
8101,8102 (w/FC4525)	6226687	6226686	N/A
8140	4448556	4448557	4448558

* With packing material for units with upending feature (#9840) previously installed.

For 8100 Information Systems without 8101 or 8102 Storage and I/O units attached:

- Use Figure 2 below to order appropriate kit B/M.
- Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without

8101 or 8102 Attached			
Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	4448579	4448580	4448549

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101 or 8102 Attached - Spanish			
Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226492	6226496	N/A
8101,8102 (w/FC4525)	6423302	6423301	N/A
8140	6226495	6226499	6226851

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101 or 8102 Attached - Spanish			
Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6226502	6226505	6226852

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101 or 8102 Attached - French Canadian			
Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226590	6226594	N/A
8101,8102 (w/FC4525)	6423304	6423303	N/A
8140	6226593	6226597	6226849

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101 or 8102 Attached - French Canadian			
Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6226600	6226603	6226850

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101 or 8102 Attached - Japanese	
Kit W/O	Kit W/

Machine	Packaging Material	Packaging Material	Relocate Package*
8101,8102	6423295	6423296	N/A
8101,8102 (w/FC4525)	6423297	6423298	N/A
8140	6423287	6423288	6423289

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101 or 8102 Attached - Japanese			
Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6423290	6423291	6423292

* With packing material for units with upending feature (#9840) previously installed.

- Check for missing/damaged wrap plugs. If required, see "Wrap Plugs" below.
- If up-ending is required to position the 8140, see "Upending Feature 8140" below.
- Ordering Information: (Canada only) Order via MSORDER (category - supplies/accessories.<) (Except Canada and Japan) Order via MES from Raleigh.<) (Japan only) Order via MES from Fujisawa.<)

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3

Figure 3

Comm Feature	Comm Cable Grp No.	Wrap Plug P/N
Loop Station Adapter (Single Lobe)	#3709	7389282
DDSA	#3717	6835350
V.35 Modem	#3718	6835348
V.35 Direct Connect	#3719	6835349
V.35 Direct-Connect Pt to Pt	#3720	6835642
EIA Direct Connect	#3721	6835642
EIA Modem	#3724	6835346
Loop Station Adapter (Double Lobe)	#3726	7389282
EIA Direct-Connect Pt to Pt	#3727	6835347
X.21	#3728	6835379

Ordering Information: Via Branch Office, from Mechanicsburg.

SUPPLIES (NONE)

DEVICE ATTACHMENT

Direct-Attached Devices: The following devices can attach directly to the processor

MACHINES

- 3277 Display Station Models 1, 2
- 3284 Printer Models 1, 2
- 3286 Printer Models 1, 2
- 3287 Printer Models 1, 2
- 3288 Line Printer Model 2
- 3732 Text Display Station
- 3736 Printer

- 8101, 8102 Storage and I/O Unit
- 8809 Magnetic Tape Unit

Loop-Attached Devices: The following devices can attach to a direct-attached loop or to a data link-attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator". GA27-2876, for selection of the 8140 communication ports features.

Device and Model	Loop Attachment		
	Direct-At 9600 bps	38,400 bps	Data Link 2400, 4800,9600 bps
3104 Display Terminal Model B1,B2	X	X	X
3230 Printer Model 1	X	X	X
3232 Printer Model 11	X	X	X
3262 Printer Models 2,12	(1)	X	(1)
3268 Printer Model 1	X	X	X
3274 Control Unit Model 51C,61C:	X	X	X
- 3178 Display Station			
- 3179 Color Display Station Model 1			
- 3179 Color Graphics Display Station Model G1, G2			
- 3180 Display Station Model 1			
(available only when emulating a 3278)			
- 3230 Printer Model 2			
- 3262 Printer Models 3,13			
- 3262 Printer Model 2			
- 3268 Printer Model 1			
- 3278 Display Station Models 1,2,3,4,5			
- 3279 Color Display Unit Models 2A, 2B,3A,3B			
- 3287 Printer Models 1,2,1C,2C			
- 3289 Printer Models 1,2			
3274 Control Unit Model 52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station Model 1			
(available only when emulating a 3278)			
- 3262 Printer Model 2			
- 3268 Printer Model 2			
- 3278 Display Station Models 1,2,52			
- 3283 Printer Model 52			
- 3287 Printer Models 1,2			
3276 Control Unit Display Station Models 11,12,13,14 with:	X		X
- 3178 Display Station			
- 3179 Color Display Station			
- 3180 Display Station Model 1			
(available only when emulating a 3278)			
- 3230 Printer Model 2			
- 3262 Printer Model 13			
- 3268 Printer Model 2			
- 3278 Display Station Models 1,2,3,4			
- 3279 Color Display Models 2A,2B,3A,3B			
- 3287 Printer Models 1,2,1C,2C			
- 3289 Printer Models 1,2			
3287 Printer Models 11, 12	X (1)	X	X (1)
3289 Printer Model 3 with:			
- 2502 Card Reader Model A1*			
- 3501 Card Reader			
- 3521 Card Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting Terminal Models 1,2	X		X
3642 Encoder Printer Models 1,2	X		X
3643 Keyboard Display Models 2,3,4	X		X
3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance Terminal	X		
4701 Finance Communication			

MACHINES

Controller Model 1
5210 Printer E1,E2
7426 Terminal Interface Unit 1,
with associated terminals
3775 Display Terminal Models 1,2

X	X	X
X		
X	X	X
X	X	X

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289 Model 3, 3262 model 2 or 3262 model 12 printer should be considered in cases where the printer will be heavily utilized.

Communication-Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data, see the M2700 pages and appropriate machine pages or for additional information.

Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of 8140 communication ports features.

Terminals conforming to 2780/3780 line protocol

- 3232 Printer Model 1
- 3274 Control Unit Model 51C,61C with:
 - 3178 Display Station
 - 3179 Color Display Station Model 1
 - 3179 Color Graphics Display Station Model G1, G2
 - 3180 Display Station Model 1 (available only when emulating a 3278)
- 3230 Printer Model 2
 - 3262 Printer Models 3,13
 - 3268 Printer Model 2
 - 3278 Display Station Models 1,2,3,4,5
 - 3279 Color Display Station Models 2A,2B,3A,3B
 - 3287 Printer Models 1,2,1C,2C
 - 3289 Line Printer Models 1,2
- 3274 Control Unit Model 52C with:
 - 3178 Display Station
 - 3180 Display Station Model 1 (available only when emulating a 3278)
 - 3268 Printer Model 2
 - 3278 Display Station Models 1,2,52
 - 3283 Printer Model 52
 - 3287 Printer Models 1,2
- 3276 Control Unit Display Station Models 1*,2*,3*,4*,11,12, 13,14 with: (* These Models are supported in SDLC mode)
 - 3178 Display Station
 - 3179 Color Display Station
 - (not supported on 3276 Model 1)
 - 3180 Display Station Model 1 (available only when emulating a 3278)
- 3230 Printer Model 2
 - 3262 Printer Model 13
 - 3268 Printer Model 2
 - 3278 Display Station Models 1,2,3,4 (See M3276 for configuration details)
 - 3279 Color Display Station Models 2A,2B,3A,3B (Not supported on 3276 Models 1,2,3,4)

- 3287 Printer Models 1,2,1C,2C
- 3289 Line Printer Models 1,2
- 3601 Finance Communication Controller Models 1,2A,2B,3A,3B
- 3602 Finance Communication Controller Models 1A,1B
- 3631 Plant Communication Controller Models 1A,1B
- 3632 Plant Communication Controller Models 1A,1B
- 3651 Store Controller Models 25,75
- 3684 Point of Sale Control Unit Models 1,2
- 3767 Communication Terminal Models 1,2,3
- 3843 Loop Control Unit
- 4701 Finance Communication Controller Model 1
- 4952 Processor
- 4954 Processor
- 4955 Processor
- 4959 Processor
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6360, 6580 Display Writer (3270 DSC Mode only)
- 6670 Information Distributor Models 1, 2
- 7426 Terminal Interface Unit Model 2, with associated terminals
- 8101 Storage and I/O Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 8775 Display Terminal Models 11,12

Direct-Connection Attachment: In addition to terminal attachment to the 8100 System through common carrier facilities (see M2700 pages), attachment can be made by direct-connect. The direct-connect is made by using Communication Ports Feature #1614 with specify #9682 or #9683, or #1621 with #9686 or #9688, or #1622 (NO LONGER AVAILABLE) and #9690. Shown below are the direct-connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct-connect cables.

DIRECT-CONNECTED ATTACHABLE DEVICES

8140 Attaching Device	Speed (bps)	Attaching Device Feature No.	CXX Comm. Feature No.
Devices Conforming to 2780/3780 Line Protocol	1200 1800 2400	Refer to specific device	#9690

3232-1	3600	None	#1621, #5200 and #9686
	4800		
	7200		
	9600		
	4800		
3274- 51C,61C	4800	#3701 and #6302**	#1621, #5200 and #9686
	56,000	#1550 and #6303**	#1614, #5200 and #9682
3276 3651* 25/75 3705-II	4800	#3701 w #9491** and #6302**	#1621, #5200 and #9686
	4800	#2827**	#1621, #5200 and #9686
	4800	#4714**	#1621, #5200 and #9686
		#2944**	#1614, #5200 and #9682
3705-80	4800	None	#1621, #5200 and #9686
	56,000	#6712**	#1614, #5200 and #9696
	56,000	#4931**	#1614, #5200 and #9682
4701-1 4952, 4954,4955,4959 6360	4800	None	#1621, #5200 and #9686
	4800	#2090**	#1621, #5200 and #9686
	4800	#3707**	#1621, #5200 and #9686
6580-A04, B04 6670-1,2	4800	#3705**	#1621, #5200 and #9686
	4800	#9420**	#1621, #5200 and #9686
6670-2	9600	#9420	#1621, #5200 and #9687
7426-2	4800	None	#1621, #5200 and #9686
8101,8130 8140-AXX,BXX 8140-CXX	4800	FAC 17 (see Note)	#1621, #5200 and #9686
	4800	#1621 and #9688** (see Note)	#1621, #5200 and #9686
	56,000	FAC 28 (see Note)	#1614, #5200 and #9682
8101, 8140-BXX 8140-CXX	56,000	#1614 and #9683** (see Note)	#1614, #5200 and #9682
	4800	#1733** and #9688**or #1734** and #9698**	#1621, #5200 and #9686
8150	9600	#1733** and #9688**or #1734** and #9698**	#1621, #5200 and #9687
	56,000	#1742** and #9683**or #1745** and #9693**	#1614, #5200 and #9682
8775	4800	#3701	#1621, #5200 and #9686

Note: FAC 17, 28, #1614 and #9683, or #1621 and #9688 in the at-
taching 8101, 8130, 8140 without business machine clock, or 8150
with #1733**, #1734**, #1742**, or #1745**.

** NO LONGER AVAILABLE

Specify code #9770 is available to facilitate problem determination.

8140 PROCESSOR MODELS B51 - B72

PURPOSE

The 8140 Processor provides control, storage, processing capability, disk and diskette storage, and device attachment capabilities for the 8100 Information System.

MODELS B51, B51, B61, B62, B71, B72

Mdl	Base Processor (bytes)	Non-Removable Disk Cap. (mill bytes)	Fixed Head Cap. (bytes)
B51	512K (524,288)	58MB (58,654,720)	131,072
B52	512K (524,288)	123MB (123,174,912)	131,072
B61	768K (786,432)	58MB (58,654,720)	131,072
B62	768K (786,432)	123MB (123,174,912)	131,072
B71	1024K (1,048,576)	58MB (58,654,720)	131,072
B72	1024K (1,048,576)	123MB (123,174,912)	131,072

Maximum: One per 8100 Information System.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8140 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8140 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions. Optional instructions are available for floating point arithmetic. Eight I/O interrupt levels provide for interrupt processing. The 8140 offers various amounts of bytes of processor storage. Depending on the mdl processor selected, processor storage can be up to a maximum of 1,024K (1,048,576 bytes). Capability for dynamic addressing and storage protection for up to 4 million bytes of logical storage is also available.

The 8140 mdls B51 through B72 allow for the attachment of up to four 8101 or 8102 Storage and I/O Units or three 8101 or 8102 Storage and I/O Units and one 8809 Magnetic Tape Unit mdl 1B. An alternate configuration can consist of an 8140, four 8101 or 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit mdl 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit mdl 1A or 1B.

The 8140 Processor is provided with fixed high-speed direct access storage. Disk storage of up to 123 million bytes with movable and fixed heads is available. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds, with an average rotational delay of 9.6 milliseconds. Removable diskette storage is available with up to 1MB (985,088 bytes) of storage operating at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370, 4341 or 4381 Processors via the 3704, 3705 or 3725 for SNA/SDLC or BSC line control. The 8100 System attaches to the ICA of the 115, 125, 135 or 138 Processors for BSC line control. The 8100 System can attach to the com-

munications adapter of the 4331 or 4361 Processor for BSC and/or SDLC line control. For specific attachment, see M2700 pages.

The capability of the 8100 Information System is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8140 via communication features which include data link, direct-connect, and loops that are direct-attached or data link-attached. Up to 11 communication ports can be attached to the 8140 mdls B51 through B72.

Physical security is provided through the use of key locks on the operator panel, diskette drive and machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8140 Processor is designated as a customer setup unit, thereby offering the customer early availability and relocation flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8140. Customer setup instructions will be shipped with each machine. An 8140 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341 for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Selected Configurations: To ease the selection, configuring, ordering and installation of an 8140 Processor, several selected configurations have been developed. These selected configurations are designed to be applicable for the majority of customer installations. Both DPPX and DPCX are supported. The use of Selected Configurations is recommended. Traditional configuration selection and ordering should be used for configurations not included in the selected configurations.

Publications: GC20-8100.

SPECIFY

Unless otherwise indicated, these specify features are only available at time of manufacture.

- **Relocation:** If the user relocates and/or interchanges an attaching 8101 or 8102 from one 8100 system to another, the user must consider address compatibility of the processor and its attachments. For further information, see "IBM 8100 Information System Site Planning Guide", GA27-2884. For relocation/replace kit ordering see "Relocate/Replace 8100 System Accessories".
- **Upending:** In the event the 8140-BXX must be placed on end to maneuver to the installation site, specify #9840. For additional ordering information associated with specify #9840, see Accessories "Upending Feature, 8140". Field Installation: Yes.
- **Color:** Pebble gray is the only available color.
- **Cabling:** For loop cabling information, see "Accessories" and the "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.

Machine Nomenclature:

English US	#2924
Spanish	#2931
Brazilian (Portuguese)	#2933
Canadian French	#2935

- Programming Configuration: Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations. Field Installation: Yes.

- 8101/8102 Attachment: Order #9939 for the first 8102 being attached to any model 8130 or 8140 processor. If the 8102 has feature #4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and secondary processors. This specify code supplies updated maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.

- (Canada only) Voltage (AC, 1-phase, 3-wire, 60 Hz): Specify #9884 for 208V, #9894 for 240V. For conversion between 208V AC and 240V AC, contact your local CE representative. If standard 4.3m (14 ft) cable is not required, also specify #9986 for 1.8m (6 ft) cable. <)

- (Except Canada) Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
200V #2806	200V #2732
220V #2813	208V #9902
230V #2821	220V #2803
240V #2801	240V #2831<)

Frequency conversions between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

- (Japan only) Specify #9890 for locking plug, #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated. <)

Note: (Except Canada and Japan) The 3-digit Country Code on the DPMO Sheet will be used to select a power plug which matches the most commonly used power supply in the country. <)

- Industrial Automation Systems specify:

- Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, processor controllers, etc. Also includes power management systems.

SPECIAL FEATURES

Performance: The maximum number of Features for Attaching Communications (FAC) capable of concurrent operation is a function of the speed of the line, communication facilities, the operating system installed and the application work load. The maximum number of communications features which can be physically installed can exceed the operational capability. Increased processor utilization will result from sustained operation of BSC (#1603 and #1604) at the maximum aggregate data rate and may cause degradation of activity operating at lower priority levels. Analysis should be performed to determine the impact.

Note: Use of BSC 8101-A2X feature #1605 instead of features #1603 or #1604 will significantly reduce processor utilization.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System publications are dependent on the presence of functional support modules provided by DPPX, DPCX. Operational and maintenance conditions for the 8100 System are predicated on the presence of these functional support modules. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the "Functional Definition Manual 8100" which will be available from Mechanicsburg at FCS.

Display And Printer, Add'l (#1506): Provides for the attachment of additional 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to four. Maximum: Five. Field Installation: Yes. Prerequisites: #3220.

Communication Attachment (#1701): Allows the expansion of communication capabilities to include ports 5-8 or 9-12. Additional special features for line control, communication interface and modems are required to complete each communication port selected. Limitations: Port positions 9-12 not available with Display and Printer Attachment (#3220), Magnetic Tape Attachment (#4901) or Floating Point (#3750). See Table 1 for additional information. Maximum: Order once for port positions 5-8. Order again for port positions 9-12. Field Installation: Yes. Prerequisites: #3901 for first #1701 (ports 5-8).

Display And Printer Attachment (#3220): Provides for the attachment of 3277 Displays, 3732 Text Displays and 3284, 3286, 3287, 3288 and 3736 Printers in any combination up to four. Can be expanded to a maximum of 24 devices with Display and Printer, Add'l (#1506). Limitations: Not available with Communication Attachment (#1701), ports 9-12, Magnetic Tape Attachment (#4901), or Communication Attachment (#1701) ports 5-8 and Floating Point (#3750). See Table 1 for additional information. Maximum: One per 8140. Field Installation: Yes. Prerequisites: #3901 when ordered without #1701 (ports 5-8).

Floating Point (#3750): Provides for execution of 30 floating point instructions and 32 floating point registers to improve performance of floating point operations. The instructions provide for loading, adding, subtracting, comparing, multiplying, dividing, storing and controlling the sign of short (4-byte) operands and long (8-byte) operands. Limitations: Not available with Communication Attachment (#1701) ports 9-12, or Display and Printer Attachment (#3220) with Communication Attachment (#1701) ports 5-8, or Magnetic Tape Attachment (#4901) with Communication Attachment (#1701) ports 5-8. Maximum: One. Field Installation: Yes.

Feature Expansion Prerequisite (#3901): Required for first Communication Attachment (#1701) ports 5-8 or Display and Printer Attachment (#3220) without Communication Attachment (#1701) or Magnetic Tape Attachment (#4901) without Communication Attachment (#1701). Maximum: One. Field Installation: Yes. Prerequisites: #1701 or #3220 or #4901.

Expanded Function Operator Panel (#4545): This feature provides operator access to processor storage, program stop and restart capability and current operating indicators. Maximum: One. Field Installation: Yes.

Magnetic Tape Attachment (#4901): Provides for the attachment of up to four 8809 Magnetic Tape Units, consisting of one 8809 mdl 1A plus two mdl 2s and one mdl 3. Limitations: Not available if the 8101 or 8102 Storage and I/O Unit has the 8809 Magnetic Unit mdl 1A attached (#4521) or if 8809 mdl 1B is attached to the 8140 mdl BXX Processor. Not available with Display and Printer Attachment (#3220), Communication Attachment (#1701), ports 9-12, or Communication Attachment (#1701), ports 5-8 and Floating Point (#3750). See Table 1 for additional information. Maximum: One. Field Installation: Yes. Prerequisites: #3901 when ordered without #1701 (ports 5-8).

Table 1

When configuring the 8140 for Communication, Display/Printer, Magnetic Tape attachments, the table below shows the combinations of these features that may be configured.

#3901 PLUS (#1701 or #3220 or #4901)
OR
#3901 PLUS #1701 PLUS (#1701 or #3220 or #4901)

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices* per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	System* Maximum	System Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

Selected Configurations

The following table lists the appropriate selected configuration codes for each mdl and the communication capabilities for each selected configuration.

	CODE
	1 1 1 1 1 1 1 1 1
	0 0 0 0 0 0 0 0 0
	0 0 0 0 0 0 0 1 1
Description	2 3 4 5 6 8 9 0 1
8140 mdl B51, B52, B61, B62, B71, B72	x x x x x x x x x
Port 2 Dir Att Loop	x x x x x - - - x
- 38.4KB	- - - - - x - - -
- 9.6KB	x x - x x x x x x
Port 3 Dir-Att Loop	x x x x x x x x x
9.6KB	- - x x x - x x x
Port 4 Data Link	- - - - - - - x x
9.6KB	- x - - x - - - -
Port 5 Data Link	- - - - - - - - x
9.6KB	- - - - - - - - -
Port 6 Data Link	- - - - - - - - -
9.6KB	- - - - - - - - -
Port 7 Dir-Att Loop	- - - - - - - - -
9.6KB	- - - - - - - - -
Port 8 Data Link	- - - - - - - - -
9.6KB	- - - - - - - - -

Notes:

- Magnetic tape attachment to 8140, use 8809 mdl 1B.
- Recommended DPPX configurations:
 - No less than 512K processor storage
 - No less than 58MB disk storage
 - Fixed Head feature in processor disk

Selected Configuration Attachment (#1002): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2

--- a 9600 bps, single-lobe loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1003): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- an SDLC link up to 9600 bps in Port 4 --- and a single-lobe, 9600 bps loop in Port 7. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1004): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- and an SDLC link up to 9600 bps in Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1005): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1006): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- an SDLC link up to 9600 bps in Port 4 and Port 5 --- and a single-lobe, 9600 bps loop in Port 7. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1008): Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1009): Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4 and Port 5. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1010): Provides for the selection and attachment of one, single-lobe, 9600 bps loop in Port 3 --- and an SDLC link up to 9600 bps in Port 4, Port 5 and Port 6. See Table 5 for component features. Maximum: One. Field Installation: Yes.

Selected Configuration Attachment (#1011): Provides for the selection and attachment of one, single-lobe, 38,400 bps loop in Port 2 --- a 9600 bps, single-lobe loop in Port 3 and Port 7 --- and an SDLC link up to 9600 bps in Port 4, Port 5, Port 6 and Port 8. See Table 5 for component features. Maximum: One. Field Installation: Yes.

COMMUNICATIONS and LOOPS

CCITT V.35 Interface (#1550): Provides interface to external modems/data communication equipment to 56,000 bps or Direct Connection at speeds up to 9600 bps and at 56,000 bps. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 31, 33, or two FAC codes 08, 09. Maximum: For speeds up to 9600 bps, one per selected Communication feature (#1601 or #1602). For operation at speeds greater than 9600 bps, one per 8140 or one per 8140/8101. Field Installation: Yes. Prerequisites: #1601 --- #1602 and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

SDLC Communications with Business Machine Clock (#1601): Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems, direct connection and CCITT V.35 Interface. Limitations: In an 8100 System, only ten loop or SDLC communication ports may be active at one time. Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature (#1602, #1603 or #1604) selected. Field Installation: Yes. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. Prerequisites: #1701 for ports 5-12.

SDLC Communications without Business Machine Clock (#1602): Provides control for EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface, CCITT V.35 Interface and Loop Adapter. Limitations: In an 8100 System only ten loop or SDLC communi-

cation ports may be active at one time. Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature (#1601, #1603 or #1604) selected. Field Installation: Yes. Prerequisites: #1701 for ports 5-12. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC/SS Communications with Business Machine Clock (#1603): Provides control for EIA RS-232-C/CCITT V.24/V.28 Interface, integrated modems or direct connection. Limitations: Start/Stop Communications are not available with integrated modems. In an 8100 System, the maximum aggregate BSC data rate is 19,200 bps and 660 bps for Start/Stop. BSC mutually exclusive with 8101-A2X FAC Codes 42 or 46 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature (#1601, #1602 or #1604) selected. Field Installation: Yes. Prerequisites: #1701 for ports 5-12. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

BSC Communications without Business Machine Clock (#1604): Provides control for EIA RS-232-C/CCITT V.24/V.28/CCITT X.21bis/V.28 Interface and direct connection. Limitations: In an 8100 System, the maximum aggregate BSC data rate is 19,200 bps. BSC mutually exclusive with 8101-A2X FAC Codes 42 or 46 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Maximum: 11. 19 per 8100 System. The maximum is reduced by one for each Communication feature (#1601, #1602 or #1603) selected. Field Installation: Yes. Prerequisites: #1701 for ports 5-12. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

PSNA (#2947): Provides for the attachment of Modem, Integrated, Switched (#5501) to the Public Switched Telephone Network. Maximum: One per #5501. Field Installation: Yes. Prerequisites: #5501.

EIA RS-232-C/CCITT V.24/V.28 CCITT X.21bis/V.28 Interface (#3701): Provides interface to external modems/data communication equipment or direct connection at speeds up to 9600 bps. Maximum: Seven. One per selected Communication feature (#1601, #1602, #1603 or #1604) in ports 2-8. Field Installation: Yes. Prerequisites: #1601 --- #1602 --- #1603 --- #1604 --- #1602 and #5200 --- #1604 and #5200. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter (#4830): Provides for the direct attachment of a single-lobe loop at 9600 or 38,400 bps. Maximum: 11. 19 per 8100 System. Only two of these features may operate at 38,400 bps in an 8140/8101. The maximum is reduced by one for each selected communication facility attached to the 8140. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: Three. One for ports 2-4 and one for each #1701. Maximum is five per 8100 System. Field Installation: Yes. Prerequisites: #4830. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Multi-Speed Clock (#5200): Provides business machine clocking at 2400, (FAC 44 only) 4800, 9600 and 56,000 bps for direct connection facilities. Can provide multiple speeds simultaneously. Maximum: Three. One for ports 2-4 and one for each #1701. Maximum is five per 8100 System. Field Installation: Yes. Prerequisites: #1602 or #1604. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section.

Modem, Integrated, Nonswitched (#5500): Provides interface to PTT or common carrier leased facilities at 600 or 1200 bps. Limitations: Not available for Start/Stop communication facilities. Maximum: One per selected Communication feature (#1601 or #1603). Field Installation: Yes. Prerequisites: #1601 or #1603. Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. (Japan only> Specify #2943 for NTT D-1 line service. <)

(Except Japan> Modem, Integrated, Switched (#5501): Provides interface to <) (Except Japan> PTT or <) (Except Japan> common carrier switched facilities with auto answer at 600 or 1200 bps. Limitations: Not available with Start/Stop communication facilities. Maximum: One per #1601. Field Installation: Yes. Prerequisites: #1601. <) (Except Japan> Specify: Code as provided in FAC descriptions in the "Communication Capabilities" section. <)

X.21 Adapter for Nonswitched Networks (#5655): Provides interface for attachment to X.21 data communication equipment nonswitched at speeds up to 48,000 bps in point-to-point or multipoint configurations. Maximum: One per selected Communication feature (#1602). One per 8140 or one per 8140/8101. Limitations: Operation at 48,000 bps is mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.

X.21 Adapter for Switched Networks (#5656): Provides interface for attachment via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21, as it is delineated in GA27-3287, switched at speeds up to 48,000 bps. Limitations: Operation at greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 29, 31 or two FAC codes 08, 09. Maximum: One per #1602. For operation at greater than 9600 bps, one per 8140 or one per 8140/8101. Field Installation: Yes. Prerequisites: #1602. Specify: Code as provided in the FAC description in "Communication Capabilities" section.

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MODEL CONVERSIONS

The following model changes can be field installed:

To	B52	B61	B62	B71	B72
From					
B51	X	X	X	X	X
B52			X		X
B61			X	X	X
B62					X
B71					X

ACCESSORIES

CABLES - LOOP

Loop cables can be purchased from IBM or a customer-selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.
- Other Loop Cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multi-use Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
- Indoor Cable P/N 1657265: UL approved (style 2919) for interconnection of low voltage electronic equipment. Maximum allowable cable temperature range is -34 degrees C to +80 degrees C.
- Indoor Cable P/N 7838694: UL approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34 degrees C to +90 degrees C.

- Indoor Cable P/N 7838695: UL approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34 degrees C to +105 degrees C.
- Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34 degrees C to +80 degrees C.
- Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34 degrees C to +80 degrees C.
- Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft)

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8m (1,000 ft.).

Exterior cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3,000 ft), by specifying the length wanted. Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multi-use Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

2 X 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called radials. The point where a radial line terminates at the LWC is called an LWC port. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer-supplied volt-ohmm, capable of reading 0.5 ohms and rated at least 5000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohmm to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

System Loop Accessories Part Number
Order via MES from Raleigh:

Loop Splice Plate (LSP)	
(indoor)	1657300
Loop Station Connector	
(Radial LSC)	1657310
Loop Station Connector	
(Wrap LSC)	1657320
Loop Station Connector Gasket	1657260
Loop Wiring Concentrator (LWC)	1657330
LWC Circuit Board Assy	
(order instead of LWC-1657330)*	1657332
Loop Surge Suppressor (LSS)	1657350
LSS Circuit Board Assy	
(order instead of LSS-1657350)*	1657354
Continuity and Relay Tester	1657420
Wrap Switch Access Cover	1657325
Loop Accessory Keys(10 spares)**	1657379
2 x 4 Adapter Plate (2AP)	7838771

Order via MES from Fujisawa:	
Conventional Box (indoor)	
5 x 10cm - (2 x 4 inches)	2102151
Clamp (for cable to indoor box)	2100264
Environmental Box	
(outdoor) 7 x 11.5cm - (2.75 x 4.5 in)	
(For industrial use)	1657280
Environmental Clamp -	
small (for indoor	
cable to environmental box)	2114285
Environmental Clamp -	
large (for outdoor	
cable to environmental box)	1657377
Metric conduit adapter	1657292
Environmental Enclosure - NEMA - 4X	

36 x 30 x 15cm (14 x 12 x 6 in.) 1657305
Environmental Enclosure Mtg Pnl 1657306
Sealing - Locknut 1657307

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** One package (ten keys) shipped with each 8101 or 8140. One key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use machine type 8101 or 8140.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments. However, see local CE management for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the branch office.

To enable a customer to test his installed loops it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

Relocate/Replace Kits(Except French Canadian and Spanish): The material required to perform machine relocation or processor replacement has been grouped into machine type-dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8140 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	4448550	4448551	N/A
8101,8102 (w/ FC4525)	6226687	6226686	N/A
8140	4448556	4448557	4448558

* With packing material for units with upending feature (#9840) previously installed.

For 8100 Information Systems without 8101 or 8102 storage and I/O units attached:

- Use Figure 2 below to order appropriate kit B/M.
- Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without
8101 or 8102 Attached

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	4448579	4448580	4448549

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226492	6226496	N/A
8101,8102 (w/ FC4525)	6423302	6423301	N/A
8140	6226495	6226499	6226851

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit With Packaging Material	Relocate Package*
8140	6226502	6226505	6226852

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226590	6226594	N/A
8101,8102 (w/FC4525)	6423304	6423303	N/A
8140	6226593	6226597	6226849

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6226600	6226603	6226850

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6423295	6423296	N/A
8101,8102 (w/FC4525)	6423297	6423298	N/A
8140	6423287	6423288	6423289

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6423290	6423291	6423292

* With packing material for units with upending feature (#9840) previously installed.

- Check for missing/damaged wrap plugs. If required, see "Wrap Plugs" below.
- If up-ending is required to position the 8140, see "Upending Feature - 8140" below.

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3.

Figure 3

Comm Feature	Comm Cable Grp No	Wrap Plug Part No
Loop Station Adapter (Single Lobe)	#3709	7389282
DDSA	#3717	6835350
V.35 Modem	#3718	6835348
V.35 Direct Connect	#3719	6835349
V.35 Direct Connect Pt To Pt	#3720	6835642
EIA Direct Connect	#3721	6835642
EIA Modem	#3724	6835346
Loop Station Adapter (Double Lobe)	#3726	7389282
EIA Direct Connect Pt to Pt	#3727	6835347
X.21	#3728	6835379

Ordering Information: Via Branch Office, Code 'S' from Mechanicsburg

SUPPLIES (NONE)

COMMUNICATION CAPABILITIES

There are a variety of Communication Facilities (see M2700 pages) supported by the 8140 mdls B51 through B72 Features for Attaching Communications (FAC) which differ in speed, protocol and attachment interfaces. These FAC codes have been categorized as LOOP, SDLC, BSC and Start/Stop. The user should select the desired communication FAC code and refer to the full special feature description and the FAC code description (identified by the abbreviation 'FAC No.') for additional details. Reference to switched communications in the FAC codes refers to the communication link between the 8100 System and the S/370.

The 8140 mdls B51 through B72 special features allow a maximum of 11 communication capabilities to be configured and designated as communication ports. Each communication port position (2 through 12) must consist of a communications feature for SDLC, BSC or Start/Stop.

Planning: When configuring communication ports for 8140 mdl B, thought should be given to possible future upgrades to 8140 mdl C in a network. These activities may be easier to implement if the port assignment capabilities of the 8140 mdls C (feature codes #1610 through #1614 plus #1620, #1621 and #1630) are studied first and the communication port assignment for the 8140 mdl B is then made in a way to minimize future reassignments and address changes. The SDLC communications feature is available with and without business machine clock (#1601, #1602). The BSC/SS communications feature (#1603) is available with business machine clock and the BSC communications feature (#1604) is available without business machine clock. If an 8140 communication port is to provide the attached facility with business machine clock at speeds of 2400 bps or greater for FAC 44 or 4800 bps or greater for other FAC codes. The Multi-Speed Clock feature (#5200) is required.

In addition to selecting a communications feature (#1601, #1602, #1603, #1604) for each port configured in an 8140, a communication interface or integrated modem must be selected to support the Communication Facility attaching to that port. A two-lobe loop port requires three special features (#1602, #4830 and #4835). Direct connect at 2400, (FAC 44 only) 4800, 9600 and 56,000 bps requires the Multi-Speed Clock feature (#5200). Each port of the 8140 also requires the selection of a specify code to indicate the System 8100 FAC code selected for that port. Certain System 8100 FAC Codes will require a second specify code to select options available within that facility: 2/4-wire or line speed.

Note: Within a given FAC, the selected option (2/4 wire, LPDA or line speed) can be changed in the field by the CE. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a FAC and its associated feature and specify codes must identify the original codes ordered from the factory.

Specify and FAC Code Descriptions: A specify code number is required to identify the selected FAC Code and its physical port position. The specify code is constructed by concatenating the selected FAC and its port position to the numeral 9 or 8 (where "9" is for ports 2 through 8 and "8" for ports 9 through 12), e.g., #9ABC or #8ABC where AB = FAC No. and C = Port Position.

FAC codes range in number from 08 to 61. Additional codes may be specified for selected options. These codes are outlined in the FAC code descriptions. No two FAC codes can occupy the same port position. "Configuration Manual", GA27-2876, will aid in assigning the port positions.

LOOP

FAC No. FAC Code Description

FAC 08	Loop, high-speed single-lobe at 38,400 bps
FAC 09	Loop, high-speed two-lobe at 38,400 bps
FAC 10	Loop, single-lobe at 9600 bps
FAC 11	Loop, two-lobe at 9600 bps

FAC 08 Loop High-Speed, Single-Lobe: Required for operating a loop at 38,400 bps. Limitations: If two 08 FAC codes are specified, FAC codes 09, 26, 28, 29, 31, or 33 are not available. Maximum: Two per 8140 or two per 8140/8101. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify

Selection	Port 2	Port 3
Port	#9082	#9083

	Port 4	Port 5	Port 6
Port	#9084	#9085	#9086

	Port 7	Port 8	Port 9
Port	#9087	#9088	#9081

	Port 10	Port 11	Port 12
Port	#8082	#8083	#8084

FAC 09 Loop High-Speed, Two-Lobe: Required for operating a two-lobe loop at 38,400 bps. Limitations: If two 09 FAC codes are specified, FAC codes 08, 26, 28, 29, x31, or 33 are not available. Maximum: Two per 8140 or two per 8140/8101. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required code to complete the configuration for the port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9092	#9093	#9094

Selection	Port 5	Port 6
Port	#9095	#9096

	Port 7	Port 8	Port 9
Port	#9097	#9098	#8091

	Port 10	Port 11	Port 12
Port	#8092	#8093	#8094

FAC 10 Loop, Single-Lobe: Required for operating a loop at 9600 bps. Prerequisites: #1602 and #4830. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9102	#9103	#9104

Selection	Port 5	Port 6
Port	#9105	#9106

	Port 7	Port 8	Port 9
Port	#9107	#9108	#8101

	Port 10	Port 11	Port 12
Port	#8102	#8103	#8104

FAC 11 Loop, Two-Lobe: Required for operating two-lobe loops at 9600 bps. Prerequisites: #1602, #4830 and #4835. Specify: From the table below, specify the required codes to complete the configuration for each port selected. Maximum: Three, one for ports 2-4, one for ports 5-8 and one for ports 9-12. Two with FAC 09.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9112	#9113	#9114

Selection	Port 5	Port 6
Port	#9115	#9116

	Port 7	Port 8	Port 9
Port	#9117	#9118	#8111

	Port 10	Port 11	Port 12
	#8112	#8113	#8114

SDLC

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28

FAC 12	600 or 1200 bps (External modem)
FAC 13	Up to 9600 bps (External modem)
FAC 15	600, 1200 or 2400 bps Direct connection with clock (No modem)
FAC 16	4800 or 9600 bps Direct connection with clock (No modem)

CCITT V.35

FAC 24	Direct connection with clock (No modem) 600, 1200 or 2400 bps
FAC 25	Direct connection with clock (No modem) 4800 or 9600 bps
FAC 26	Direct connection with clock (No modem) 56,000 bps
FAC 27	Direct connection without clock (No modem) 9600 bps
FAC 28	Direct connection without clock (No modem) 56,000 bps
FAC 29	Up to 56,000 bps nonsw

CCITT X.21

FAC 30	Up to 9600 bps nonswitched
FAC 31	48,000 bps nonswitched
FAC 32	Up to 9600 bps switched
FAC 33	48,000 bps switched

FAC 12 EIA RS-232-C/CCITT V.24/V.28 Interface: 600 or 1200 bps with business machine clock - operating with external modem without clocking - and point-to-point switched 2-wire - or point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1601 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9122	#9123	#9124
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6
Port	#9125	#9126
600 bps	#9745	#9746
1200 bps	#9755	#9756

	Port 7	Port 8
Port	#9127	#9128
600 bps	#9747	#9748
1200 bps	#9757	#9758

FAC 13 EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 Interface:

Up to 9600 bps without business machine clock - with external data communication equipment and clock - point-to-point switched with auto answer to 9600 bps - point-to-point nonswitched 2- or 4-wire - or multipoint 4-wire. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9132	#9133	#9134
LPDA	#9802	#9803	#9804

	Port 5	Port 6
Port	#9135	#9136
LPDA	#9805	#9806

	Port 7	Port 8
Port	#9137	#9138
LPDA	#9807	#9808

FAC 15 EIA RS-232-C/CCITT V.24/V.28 Interface:

600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Prerequisites: #1601 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9152	#9153	#9154
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
2400 bps	#9762	#9763	#9764

	Port 5	Port 6
Port	#9155	#9156
600 bps	#9745	#9746
1200 bps	#9755	#9756
2400 bps	#9765	#9766

	Port 7	Port 8
Port	#9157	#9158
600 bps	#9747	#9748
1200 bps	#9757	#9758
2400 bps	#9767	#9768

FAC 16 EIA RS-232-C/CCITT V.24/V.28 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 40 ft. Prerequisites: #1602, #3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9162	#9163	#9164
4800 bps	#9772	#9773	#9774
9600 bps	#9782	#9783	#9784

	Port 5	Port 6
Port	#9165	#9166
4800 bps	#9775	#9776
9600 bps	#9785	#9786

	Port 7	Port 8
Port	#9167	#9168
4800 bps	#9777	#9778
9600 bps	#9787	#9788

FAC 17 EIA RS-232-C/CCITT V.24/V.28 Interface:

Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 40 ft. Prerequisites: #1602 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9172	#9173	#9174

	Port 5	Port 6
Port	#9175	#9176

	Port 7	Port 8
Port	#9177	#9178

FAC 18 Integrated Modem:

600 or 1200 bps - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Prerequisites: #1601 and #5500. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

MACHINES

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9182	#9183	#9184
2-wire			
600 bps	#9852	#9853	#9854
1200 bps	#9862	#9863	#9864
4-wire			
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6	
Port	#9185	#9186	
2-wire			
600 bps	#9855	#9856	
1200 bps	#9865	#9866	
4-wire			
600 bps	#9745	#9746	
1200 bps	#9755	#9756	

	Port 7	Port 8	Port 9
Port	#9187	#9188	#8181
2-wire			
600 bps	#9857	#9858	#8851
1200 bps	#9867	#9868	#8861
4-wire			
600 bps	#9747	#9748	#8741
1200 bps	#9757	#9758	#8751

	Port 10	Port 11	Port 12
Port	#8182	#8183	#8184
2-wire			
600 bps	#8852	#8853	#8854
1200 bps	#8862	#8863	#8864
4-wire			
600 bps	#8742	#8743	#8744
1200 bps	#8752	#8753	#8754

(Except Japan > FAC 19 Integrated Modem: 600 or 1200 bps - point-to-point switched with auto answer 2-wire. Prerequisites: #1601 and #5501. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9192	#9193	#9194
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6	
Selection			
Port	#9195	#9196	
600 bps	#9745	#9746	
1200 bps	#9755	#9756	

	Port 7	Port 8	Port 9
Port	#9197	#9198	#8191
600 bps	#9747	#9748	#8741
1200 bps	#9757	#9758	#8751

	Port 10	Port 11	Port 12
Port	#8192	#8193	#8194
600 bps	#8742	#8743	#8744
1200 bps	#8752	#8753	#8754<)

FAC 24 CCITT V.35 Interface: 600, 1200 or 2400 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1601 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9242	#9243	#9244
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754
2400 bps	#9762	#9763	#9764

	Port 5	Port 6	
Selection			
Port	#9245	#9246	
600 bps	#9745	#9746	
1200 bps	#9755	#9756	
2400 bps	#9765	#9766	

	Port 7	Port 8	Port 9
Port	#9247	#9248	#8241
600 bps	#9747	#9748	#8741
1200 bps	#9757	#9758	#8751
2400 bps	#9767	#9768	#8761

	Port 10	Port 11	Port 12
Port	#8242	#8243	#8244
600 bps	#8742	#8743	#8744
1200 bps	#8752	#8753	#8754
2400 bps	#8762	#8763	#8764

FAC 25 CCITT V.35 Interface: 4800 or 9600 bps with business machine clock - operating with no modem (attached machine must not provide business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9252	#9253	#9254
4800 bps	#9772	#9773	#9774
9600 bps	#9782	#9783	#9784

	Port 5	Port 6	
Selection			
Port	#9255	#9256	
4800 bps	#9775	#9776	
9600 bps	#9785	#9786	

	Port 7	Port 8	Port 9
Port	#9257	#9258	#8251
4800 bps	#9777	#9778	#8771
9600 bps	#9787	#9788	#8781

	Port 10	Port 11	Port 12
Port	#8252	#8253	#8254
4800 bps	#8772	#8773	#8774
9600 bps	#8782	#8783	#8784

FAC 26 CCITT V.35 Interface: 56,000 bps with business machine clock - operating with no modem - and direct connection up to 1,000 ft or up to a total cable length of 200 ft to a 3705. Limitations: Mutually exclusive with FAC codes 28, 29, 31, 33 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602, #1550 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify			
Selection	Port 2	Port 3	Port 4
Port	#9262	#9263	#9264

	Port 5	Port 6	
Port	#9265	#9266	

	Port 7	Port 8	Port 9
Port	#9267	#9268	#8261

	Port 10	Port 11	Port 12
Port	#8262	#8263	#8264

FAC 27 CCITT V.35 Interface: Up to 9600 bps without business machine clock - operating with other 8100 System (with business machine clock) - and direct connection up to 1,000 ft. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9272	Port 3 #9273	Port 4 #9274
Port	Port 5 #9275	Port 6 #9276	
Port	Port 7 #9277	Port 8 #9278	Port 9 #8271
Port	Port 10 #8272	Port 11 #8273	Port 12 #8274

FAC 28 CCITT V.35 Interface: 56,000 bps without business machine clock - operating with no modem - and direct connection up to 1,000 ft to another 8100 System (with business machine clock). Limitations: Mutually exclusive with FAC codes 26, 29, 31, 33 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9282	Port 3 #9283	Port 4 #9284
Port	Port 5 #9285	Port 6 #9286	
Port	Port 7 #9287	Port 8 #9288	Port 9 #8281
Port	Port 10 #8282	Port 11 #8283	Port 12 #8284

FAC 29 CCITT V.35 Interface: Up to 56,000 bps without business machines clock and external data communication equipment with clock, and point-to-point or multipoint nonswitched. Limitations: Operation at speeds greater than 9600 bps is mutually exclusive with FAC codes 26, 28, 31, 33 or two FAC codes 08, 09. Maximum: For operation at speeds greater than 9600 bps, one per 8140 or one per 8140/8101. Prerequisites: #1602 and #1550. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9292	Port 3 #9293	Port 4 #9294
Port	Port 5 #9295	Port 6 #9296	
Port	Port 7 #9297	Port 8 #9298	Port 9 #8291
Port	Port 10 #8292	Port 11 #8293	Port 12 #8294

FAC 30 CCITT X.21 Interface: Up to 9600 bps without business machine clock and 4-wire point-to-point nonswitched or multipoint nonswitched. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9302	Port 3 #9303	Port 4 #9304
Port	Port 5 #9305	Port 6 #9306	
Port	Port 7 #9307	Port 8 #9308	Port 9 #8301
Port	Port 10 #8302	Port 11 #8303	Port 12 #8304

FAC 31 CCITT X.21 Interface: 48,000 bps without business machine clock and point-to-point or multipoint nonswitched operation. Limitations: Mutually exclusive with FAC codes 26, 28, 29, 33 or two FAC codes 08, 09. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602 and #5655. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9312	Port 3 #9313	Port 4 #9314
Port	Port 5 #9315	Port 6 #9316	
Port	Port 7 #9317	Port 8 #9318	Port 9 #8311
Port	Port 10 #8312	Port 11 #8313	Port 12 #8314

FAC 32 CCITT X.21 Interface: Up to 9600 bps without business machine clock and switched with auto answer and auto call. Prerequisites: #1602 and #5656. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9322	Port 3 #9323	Port 4 #9324
Port	Port 5 #9325	Port 6 #9326	
Port	Port 7 #9327	Port 8 #9328	Port 9 #8321
Port	Port 10 #8322	Port 11 #8323	Port 12 #8324

FAC 33 CCITT X.21 Interface: Up to 48,000 bps without business machine clock and switched with auto answer and auto call. Limitations: Mutually exclusive with FAC codes 26, 28, 29, 31 or two FAC codes 08, 09. One per 8140 or one per 8140/8101. Maximum: One per 8140 or one per 8140/8101. Prerequisites: #1602 and #5656. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection Port	Port 2 #9332	Port 3 #9333	Port 4 #9334
Port	Port 5 #9335	Port 6 #9336	
Port	Port 7 #9337	Port 8 #9338	Port 9 #8331
Port	Port 10 #8332	Port 11 #8333	Port 12 #8334

BSC

FAC No. FAC Code Description

EIA RS-232-C/CCITT V.24/V.28/CCITT
X.21bis/V.28

FAC 40 600 or 1200 bps(External modem)
FAC 41 Up to 9600 bps (External modem)
FAC 44 2400, 4800 or 9600 bps direct
connection with clock(No modem)

Integrated Modem

FAC 45 600 or 1200 bps nonswitched

FAC 40 EIA RS-232-C/CCITT V.24/V.28 Interface: 600 or 1200 bps with business machine clock - operating with external modem with no clock - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 or 46 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1603 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9402	#9403	#9404
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6
Port	#9405	#9406
600 bps	#9745	#9746
1200 bps	#9755	#9756

	Port 7	Port 8
Port	#9407	#9408
600 bps	#9747	#9748
1200 bps	#9757	#9758

FAC 41 EIA RS-232-C/CCITT V.24/V.28 X.21bis/V.28 Interface: Up to 9600 bps without business machine clock - operating with external data communication equipment - and point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 or 46 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1604 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9412	#9413	#9414

	Port 5	Port 6
Port	#9415	#9416

	Port 7	Port 8
Port	#9417	#9418

FAC 44 EIA RS-232-C/CCITT V.24/V.28 Interface: 2400, 4800 or 9600 bps with business machine clock - operating with no modem (attached downstream terminal must not provide business machine clock) - and direct connection up to 40 ft. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 or 46 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1604.

#3701 and #5200. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9442	#9443	#9444
2400 bps	#9762	#9763	#9764
4800 bps	#9772	#9773	#9774
9600 bps	#9782	#9783	#9784

	Port 5	Port 6
Port	#9445	#9446
2400 bps	#9765	#9766
4800 bps	#9775	#9776
9600 bps	#9785	#9786

	Port 7	Port 8
Port	#9447	#9448
2400 bps	#9767	#9768
4800 bps	#9777	#9778
9600 bps	#9787	#9788

FAC 45 Integrated Modem: 600 or 1200 bps - point-to-point nonswitched 2- or 4-wire - or multipoint nonswitched 4-wire. Limitations: BSC mutually exclusive with 8101-A2X FAC codes 42 or 46 on an 8100 system. BSC not available on an 8100 system that has an attached 8102 with Display and Printer Attachment feature (#3220). Prerequisites: #1603 and #5500. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify

Selection	Port 2	Port 3	Port 4
Port	#9452	#9453	#9454
2-wire			
600 bps	#9852	#9853	#9854
1200 bps	#9862	#9863	#9864
600 bps	#9742	#9743	#9744
1200 bps	#9752	#9753	#9754

	Port 5	Port 6
Port	#9455	#9456
2-wire		
600 bps	#9855	#9856
1200 bps	#9865	#9866
4-wire		
600 bps	#9745	#9746
1200 bps	#9755	#9756

	Port 7	Port 8	Port 9
Port	#9457	#9458	#8451
2-wire			
600 bps	#9857	#9858	#8851
1200 bps	#9867	#9868	#8861
4-wire			
600 bps	#9747	#9748	#8741
1200 bps	#9757	#9758	#8751

	Port 10	Port 11	Port 12
Port	#8452	#8453	#8454
2-wire			
600 bps	#8852	#8853	#8854
1200 bps	#8862	#8863	#8864
4-wire			
600 bps	#8742	#8743	#8744
1200 bps	#8752	#8753	#8754

START/STOP

FAC No.	FAC Code	Description

EIA RS-232-C/CCITT V.24/V.28		
FAC 60	110, 134.5, 150, 300 or 600 bps	(External modem)
FAC 61	110, 134.5, 150, 300 or 600 bps	Direct connection with clock (No modem)

FAC 60 EIA RS-232-C/CCITT V.24/V.28 Interface: 110, 134.5, 150, 300 and 600 bps with business machine clock - operating with external modem - and point-to-point nonswitched facilities. See M2700 pages for specific information on communication facilities and other attachment information. Prerequisites: #1603 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9602	#9603	#9604
110 bps	#9702	#9703	#9704
134.5 bps	#9712	#9713	#9714
150 bps	#9722	#9723	#9724
300 bps	#9732	#9733	#9734
600 bps	#9742	#9743	#9744

Port	Port 5	Port 6
110 bps	#9605	#9606
134.5 bps	#9705	#9706
150 bps	#9715	#9716
300 bps	#9725	#9726
600 bps	#9735	#9736
	#9745	#9746

Port	Port 7	Port 8
110 bps	#9607	#9608
134.5 bps	#9707	#9708
150 bps	#9717	#9718
300 bps	#9727	#9728
600 bps	#9737	#9738
	#9747	#9748

FAC 61 EIA RS-232-C/CCITT V.24/V.28 Interface: 110, 134.5, 150, 300 and 600 bps with business machine clock - operating with no modem (the attached terminal must provide its own business ma-

chine clock) - and direct connection up to 40 ft. Prerequisites: #1603 and #3701. Specify: From the table below, specify the required codes to complete the configuration for each port selected.

FAC Specify Selection	Port 2	Port 3	Port 4
Port	#9612	#9613	#9614
110 bps	#9702	#9703	#9704
134.5 bps	#9712	#9713	#9714
150 bps	#9722	#9723	#9724
300 bps	#9732	#9733	#9734
600 bps	#9742	#9743	#9744

Selection	Port 5	Port 6
Port	#9615	#9616
110 bps	#9705	#9706
134.5 bps	#9715	#9716
150 bps	#9725	#9726
300 bps	#9735	#9736
600 bps	#9745	#9746

Port	Port 7	Port 8
110 bps	#9617	#9618
134.5 bps	#9707	#9708
150 bps	#9717	#9718
300 bps	#9727	#9728
600 bps	#9737	#9738
	#9747	#9748

DEVICE ATTACHMENT

Direct Attached Devices: The following devices can attach directly to the processor:

3277 Display Station mdls 1, 2
3284 Printer mdls 1, 2
3286 Printer mdls 1, 2
3287 Printer mdls 1, 2
3288 Line Printer mdl 2
3732 Text Display Station
3736 Printer
8101, 8102 Storage and I/O Unit
8809 Magnetic Tape Unit

Loop-Attached Devices: The following devices can attach to a direct-attached loop or to a data link-attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8100 FAC codes.

Device and Mdl	Loop Attachment		Data Link At 2400, 4800, 9600 bps
	Direct 9600 bps	At 38400 bps	
3104 Display Terminal B1,B2	X	X	X
3230 Printer 1	X	X	X
3232 Keybd Printer Terminal mdl 11	X	X	X
3262 Printer 2,12	(1)	X	(1)
3268 Printer 1	X	X	X
3274 Control Unit 51C,61C with:	X	X	X
- 3179 Color Display Sta mdl 1			
- 3179 Color Grphcs Display Sta mdl G1, G2			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 3,13			
- 3268 Printer 2			

- 3278 Display Station 1,2,3,4,5			
- 3279 Color Display Unit 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3274 Control Unit			
52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station 1 (avail. only when emulating a 3278)			
- 3268 Printer 2			
- 3278 Display Station 1, 2, 52			
- 3283 Printer 52			
- 3287 Printer 1,2			
3276 Control Unit			
Display	X		X
Station 11,12,13,14 with:			
- 3178 Display Station			
- 3179 Color Display Station			
- 3180 Display Station 1 (available only when emulating a 3278)			
- 3230 Printer 2			
- 3262 Printer 13			
- 3268 Printer 2			
- 3278 Display Station 1,2,3,4			
- 3279 Color Display 2A,2B,3A,3B			
- 3287 Printer 1,2,1C,2C			
- 3289 Printer 1,2			
3287 Printer	X	X	X
11,12			
3289 Printer 3	(1)		(1)
with:			
- 2502 Card Reader A1*			
- 3501 Card Reader			
- 3521 Carder Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting			
Terminal 1,	X		X
3642 Encoder			
Printer 1,2	X		X
3643 Keyboard			
Display 2,3,4	X		X
3644 Automatic			
Data Unit	X		X
3645 Printer	X		X
3646 Scanner			
Control Unit	X		X
3647 Time and			
Attendance			
Terminal	X		X
4701 Finance Comm			
Contrllr mdl 1,2	X	X	X
5210 E01,E02	X		
7426 Terminal Interface Unit 1, w/ associated			
terminals	X	X	X
8775 Display			
Terminal 1,2	X	X	X

(1) Dedication of a 9600 bps single-lobe loop to the attachment of the 3289-3, 3262-2 or 3262-12 printer should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data, see the M2700 pages and appropriate machine pages for additional information. Refer to the "IBM Information System Configurator", GA27-2876, for selection of 8100 FAC codes.

Devices conforming to TTY 33/35 or equivalent

2741 Communication Terminal
Terminals conforming to 2780/3780 line protocol
3101 Display Terminal mdls 10, 12, 13
3161 Display Station mdl 11, 12
3163 Display Station mdl 11, 12
3232 Keyboard Printer mdl 1

3274 Control Unit mdl 51C, 61C with:

- 3178 Display Station
- 3179 Color Display Station mdl 1
- 3179 Color Graphics Display Station mdl G1, G2

- 3180 Display Station 1 (available only when emulating a 3278)
- 3230 Printer mdl 2
- 3262 Printer mdls 3, 13
- 3268 Printer 2
- 3278 Display Station mdls 1, 2, 3, 4, 5
- 3279 Color Display Station mdls 2A, 2B, 3A, 3B
- 3287 Printer mdls 1, 2, 1C, 2C
- 3289 Line Printer mdls 1, 2
- 3274 Control Unit mdl 52C with:
 - 3178 Display Station
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 52
 - 3283 Printer mdl 52
 - 3287 Printer mdls 1, 2
- 3276 Control Unit Display Station mdls 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: (*These mdls are supported in SDLC mode.)
 - 3178 Display Station
 - 3179 Color Display Station (not supported on 3276 mdl 1)
 - 180 Display Station mdl 1 (available only when emulating a 3278)
 - 3230 Printer mdl 2
 - 3262 Printer mdl 13
 - 3268 Printer 2
 - 3278 Display Station mdls 1, 2, 3, 4 (See M3276 for configuration details.)
 - 3279 Color Display Station mdls 2A, 2B, 3A, 3B (Not supported on 3276 mdls 1, 2, 3, 4)

- 3287 Printer mdls 1, 2, 1C, 2C
- 3289 Line Printer mdls 1, 2
- 3600 Finance Communication Controllers
- 3630 Plant Communication Controllers
- 3651 Store Controllers mdls 25, 75
- 3684 Point of Sale Control Unit mdls 1, 2
- 3767 Communication Terminal mdls 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit
- 4700 Finance Communication Controllers
- 4952, 4954, 4955, 4959 Processor (series/1)
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6360, 6580 Displaywriter (3270 DSC Mode only)
- 6670 Information Distributor mdls 1, 2
- 8101 Storage and I/O Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 7426 Terminal Interface Unit mdl 2, with associated terminals
- 8775 Display Terminal mdls 11, 12

Direct Connection Attachment: In addition to terminal attachment to 8100 System through common carrier facilities (see M2700 pages) or local loops, attachment can be made by direct connect. The direct connect is made by using SDLC (FAC 15, 16, 17, 24, 25, 27 or 28), BSC (FAC 44) and Start/Stop (FAC 61). Shown below are the direct connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct connect cables.

DIRECT CONNECTION ATTACHABLE DEVICES

Attaching Device	Speeds bps	Attaching Device Feature No.	8100 FAC CODE
2741	134.5	#9114 and #3255	61
Devices Conforming to 2780/3780 Line Protocol	2400, 4800, 9600	Refer to specific device	44
3101, 3161, 3163	110, 150, 300, 600	None required	61
3232-1	1200, 2400	None	15
3274-51C, 61C	4800, 9600	None	16
	1200, 2400	#3701 and #6302	15
	4800, 9600	#3701 and #6302	16
	1200, 2400	#1550 and #6302	24
	4800, 9600	#1550 and #6302	25
	56,000	#1550 and #6303	26
3276	600, 1200, 2400	#3701 w #9491 and #6302	15
	4800, 9600	#3701 w #9491 and #6302	16
3651-25/75	4800	#2827	16*
3705-II	600, 1200, 2400	#4714	15
	4800, 9600	#4714	16
	56,000	#2944	26
3705-80	600, 1200, 2400	None	15
	4800, 9600	None	16
	56,000	#6712	26
3725	600, 1200, 2400	#4911	15
	4800, 9600	#4911	16
3767	600, 1200, 2400	#3718 w #9707 and #9533	15
4701	1200, 2400	None	15
	4800, 9600	None	16
4952, 4954, 4955, 4959	1200, 2400	#2090	15
6360	4800, 9600	#2090	16
	1200, 2400, 2400	#3707	15
	4800, 9600	#3707	16
6580-A04, B04	1200, 2400	#3705	15
	4800, 9600	#3705	16
6670-1, 2	600, 1200, 2400	#9420	15

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6670-2	4800	#9420	16
7426-2	9600	#9420	16
	600,1200,2400	None	15
	4800,9600	None	16
8101,8130,	600,1200,2400	FAC 17 (see Note)	15
8140-AXX	600,1200,2400	FAC 27 (see Note)	24
BXX	4800,9600	FAC 17 (see Note)	16
	4800,9600	FAC 27 (see Note)	25
8140-CXX	4800	#1621 and #9688 (see Note)	16
8101	56,000	FAC 28 (see Note)	26
8140-BXX			
8140-CXX	56,000	#1614 and #9683 (see Note)	26
8150	4800,9600	#1733 and #9688 or #1734 and #9698 (see Note)	16
	56,000	#1742 and #9682 or #1745 and #9693 (see Note)	26
8775	600,1200,2400	#3701	15
	4800,9600	#3701	16
	600,1200,2400	#1550	24
	4800,9600	#1550	25

Note: FAC 17, 27 or 28 in the attaching 8101, 8130, 8140-AXX, BXX or #1614, #1621 on 8140 mdl C, or 8150 with #1733, #1734, #1742 or #1745 without business machine clock.

*Specify #9770 is available to facilitate problem determination.

Table 5-Selected Configurations

8140 Mdl B51, B52, B61, B62, B71, B72 Selected Configuration Codes			
Selected Configuration Feature Code	Quantity-Component	Feature Code	
#1002	3-#1602, 1-#3701, 2-#4830, 1-#9082, 1-#9103, 1-#9134		
#1003	4-#1602, 1-#1701, 1-#3701, 1-#3901, 3-#4830, 1-#9082, 1-#9103, 1-#9107, 1-#9134		
#1004	3-#1602, 1-#1701, 2-#3701, 1-#3901, 1-#4830, 1-#9082, 1-#9134, 1-#9135		
#1005	4-#1602, 1-#1701, 2-#3701, 1-#3901, 2-#4830, 1-#9082,		

	1-#9103, 1-#9134, 1-#9135
#1006	5-#1602, 1-#1701, 2-#3701, 1-#3901, 3-#4830, 1-#9082, 1-#9103, 1-#9107, 1-#9134, 1-#9135
#1008	3-#1602, 1-#3701, 2-#4830, 1-#9102, 1-#9103, 1-#9134
#1009	3-#1602, 1-#1701, 2-#3701, 1-#3901, 1-#4830, 1-#9103, 1-#9134, 1-#9135
#1010	4-#1602, 1-#1701, 3-#3701, 1-#3901, 1-#4830, 1-#9103, 1-#9134, 1-#9135, 1-#9136
#1011	6-#1602, 1-#1701, 4-#3701, 1-#3901, 2-#4830, 1-#9082, 1-#9103, 1-#9134, 1-#9135, 1-#9136, 1-#9138

Note: Only the appropriate codes listed below may be specified in addition to the Selected Configuration code.

Power/Plug: #9884, #9894.
6-ft Cable: #9986
3640 Attachment: #9800
Programming Configuration: #9700, #9710, #9720, #9730
Floating Point: #3750

8140 PROCESSOR MODELS C72, C82, C92

PURPOSE

The 8140 Processor provides control, storage, processing capability, disk and diskette storage, and device or communication attachment capabilities for the 8100 Information System.

MODELS C72, C82, C92

Mdl	Base Processor Storage (bytes)	Non-Removable Disk Capacity (bytes)	Fixed Head Capacity (bytes)
C72	1024K (1,048,576)	123MB (123,174,192)	131,072
C82	1536K (1,572,864)	123MB (123,174,192)	131,072
C92	2048K (2,097,152)	123MB (123,174,192)	131,072

Maximum: One per 8100 Information System.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

The 8140 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, disk and diskette storage and communication features for the 8100 Information System. The flexibility offered by the 8140 allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs.

System control and processing is provided by machine program instructions. Optional instructions are available for floating point arithmetic. Eight I/O interrupt levels provide for interrupt processing. The 8140 C mdls offer three processor storage sizes. Depending on the mdl of the processor selected, processor storage can be up to a maximum of 2048K (2,097,152) bytes. Capability for dynamic addressing and storage protection for up to 16 million bytes of logical storage is available. The 8140 Processor mdls C72, C82 and C92 storage makes use of the Error Correction Code (ECC) to provide single-error and double-error detection capability.

The 8140 mdls C72, C82 and C92 allow for the attachment of up to four 8101 or 8102 Storage and I/O Units, or three 8101 or 8102 Storage and I/O Units and one 8809 Magnetic Tape Unit mdl 1B. An alternate configuration can consist of an 8140, four 8101 or 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit mdl 1A. Up to three additional 8809 Magnetic Tape Units can be attached to the 8809 Magnetic Tape Unit mdl 1A or 1B.

The 8140 C mdls Processor is provided with fixed high-speed direct access disk storage of 123 million bytes (consisting of two volumes) with movable and fixed heads. The disk storage operates at a data rate of 1.031 million bytes per second. The average access time is 27 milliseconds with an average rotational delay of 9.6 milliseconds. Removable diskette storage is provided with up to 1MB (985,088 bytes) of storage operating at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1.

The 8100 System can attach to any S/370, 4341 or 4381 Processor via the 3704, 3705, or 3725 for SNA/SDLC or BSC line control. The 8100 System can attach to the communications adapter of the 4331 or 4361 Processor for SDLC or BSC line control. For specific attachment, see M2700 pages.

The capability of the 8100 Information System is further extended by providing for the attachment of a variety of I/O devices. These devices may be attached to the 8140 via communication port features

which include data link, direct connect, and loops that are direct-attached or data link-attached. Up to ten communication and loop ports can be configured in the 8140 mdls C72, C82 and C92.

Physical security is provided through the use of keylocks on the operator panel, diskette drive and machine covers. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8140 Processor is designated as a customer setup unit, thereby offering the customer early availability and re-location flexibility. Aids and configurators are provided to facilitate the configuration and ordering of the 8140. Customer setup instructions will be shipped with each machine. An 8140 installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communications Loop Planning and Installation Guide", GA27-3341, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors or devices. IBM cabling system can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An "8100 Information System Maintenance Manual" SY27-2521, should be requested by the 8100 servicing organization.

Performance: The maximum number of communication and loop ports configured and capable of concurrent operation is a function of the speed of the line, communication facilities, the operating system installed and the application work load. The maximum number of communications and loop ports which can be physically installed can exceed the operational capability.

Multiple High-Speed Adapters: The 8140 C mdls have the physical capability for four (high-speed) communication ports in excess of 9600 bps. The maximum number of high-speed ports activated concurrently is limited to two.

- Two loops at 38,400 bps, or
- One loop at 38,400 bps and one SDLC data link at a speed greater than 9600 bps.

Diagnostics: The 8100 System hardware and feature operation, diagnostic support and maintenance support described in 8100 System publications require DPPX or DPCX. Customers ordering 8100 System hardware without DPPX or DPCX should provide the functional support as contained and described in the "Functional Definition Manual 8100" which will be available from Mechanicsburg at FCS.

Communications And Loops: The communication and loop attachments are available in line sets which occupy pre-defined ports. There are five sets of which one can occupy Ports 1-4, four sets of which one can occupy Ports 5-8 and one set for Ports 9 and 10. A maximum of ten ports are available. If a line set is selected for Ports 1-4, there can be no high-speed (greater than 9600 bps) ports in an attached 8101 storage and I/O unit. Conversely, if there are no line sets selected for Ports 1-4, then the 8101 may contain high-speed ports (maximum two).

The speed of the loops in communication ports features #1610-#1614 are manually switch-selectable at customer setup time at either 9600 bps or 38,400 bps. The limitation on the total number of active ports at greater than 9600 bps is two. In an 8100 System, only ten Loop or SDLC communication ports may be active at one time.

Note: With a given Communication Ports Feature the selected option LPDA can be changed in the field by the CE. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a Communication Ports

Feature and its associated specify code must identify the original codes ordered from the factory, processors or devices.

Publications: GC20-8100.

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

● Power (AC, 1-phase, 3-wire):

50 Hz	60 Hz
200V #2806	200V #2732
220V #2813	208V #9902
230V #2821	220V #2803
240V #2801	240V #2831

The power cable shipped with each machine will be 4.3m (14 ft) long.

Frequency conversion between 50 Hz and 60 Hz are not field installable. Voltage conversions between the 100V AC and 200 V AC ranges are not field installable. For voltage conversions within voltage ranges, contact your local CE representative.

- (Japan only> Specify #9890 for locking plug, #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated.<)

Note: (Except Japan>The 3-digit Country Code on the DP Machine Order Sheet will be used to select a power plug which matches the most commonly used power supply in the country.<)

- Color: Pebble gray is the only available color.
- Machine Nomenclature:

Brazilian (Portuguese)	#2933
Canadian French	#2935
English US	#2924
Spanish	#2931

- Relocation: If the user relocates and/or interchanges an attaching 8101 from one 8100 System to another, the user must consider address compatibility of the processor and its attachments. For further information, see "IBM 8100 Information System Site Planning Guide", GA27-2884. For relocation/replace Kit Ordering, see "Relocate/Replace: 8100 System" under "Accessories".
- Upending: In the event the 8140 must be placed on end to maneuver to the installation site, specify #9840. For additional ordering information associated with #9840, see Accessories "Upending Feature, 8140". Field Installation: Yes.
- Cabling: For loop cabling information, see "Accessories" and the "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341. For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884. Communication cables must be ordered separately from the communication adapter features.
- Programming Configuration: Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX or #9730 for all other configurations. Field Installation: Yes.
- 8101/8102 Attachment: Order #9939 for the first 8102 being attached to any model 8130 or 8140 processor. If the 8102 has feature #4525 (Storage and I/O Switch), or if an 8101 with feature #4525 is being installed, order #9939 for both primary and secondary processors. This specify code supplies updated

maintenance documentation and should be ordered in advance to assure its availability when the 8101 or 8102 is installed.

● Industrial Automations specify:

- Plant Floor Systems (#9010): Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

Display and Printer, Add'l (#1506): Provides for the attachment of additional 3277 Displays, 3284, 3286, 3287 and 3288 Printers in any combination up to four. Maximum: Five. Field Installation: Yes. Prerequisites: #3220.

Display and Printer Attachment (#3220): Provides for the attachment of 3277 Displays, 3284, 3286, 3287 and 3288 Printers in any combination up to four. Can be expanded to a maximum of 24 devices with Display and Printer, Add'l (#1506). Limitations: Not available with #4901 or #1630 (see Table 1 for further information). Maximum: One per 8140. Field Installation: Yes. Prerequisites: #3901 when ordered without #1620, #1621, #1622 or #1623.

Floating Point Feature (#3750): Provides for execution of 30 floating point instructions and 32 floating point registers to improve performance of floating point operations. The instructions provide for loading, adding, subtracting, comparing, multiplying, dividing, storing and controlling the sign of short (4-byte) operands and long (8-byte) operands. Maximum: One. Field Installation: Yes.

Feature Expansion Prerequisite (#3901): Required for communication ports feature #1620, #1621, #1622 or #1623 or Display and Printer Attachment (#3220) without communication ports feature #1620, #1621, #1622 or #1623 or Magnetic Tape Attachment (#4901) without communication ports feature #1620, #1621, #1622 or #1623. See Table 1. Maximum: One. Field Installation: Yes. Prerequisites: #1620, #1621, #1622 or #1623 --- #3220 or #4901 without #1620, #1621, #1622 or #1623.

Magnetic Tape Attachment (#4901): Provides for the attachment of up to four 8809 Magnetic Tape Units, consisting of one 8809 mdl 1A plus two mdl 2s and one mdl 3. Limitations: Not available if the 8101 or 8102 Storage and I/O Unit has the 8809 Magnetic Tape Unit mdl 1A attached (#4521) or if 8809 mdl 1B is attached to the 8140 mdl C72, C82 or C92 Processor. Also not available with Communication Ports Feature (#1630) or Display and Printer Attachment (#3220). See Table 1 for further information. Maximum: One. Field Installation: Yes. Prerequisites: #3901 when ordered without #1620, #1621, #1622 or #1623.

Table 1

When configuring the 8140 C mdls for communication port features for Ports 5-10 Display and Printer Attachment, and Magnetic Tape Attachment, the table below shows the combination of these features that may be configured.

#3901 plus (#1620, #1621, #1622 or #1623, or #3220 or #4901)
or
#3901 plus (#1620, #1621, #1622 or #1623)
plus (#1630, #3220 or #4901)

8100 System Maximums for Display and Printer Attachment: 8100 systems running under DPPX/SP Release 2 may have a maximum of two units with Display and Printer Attachment features attaching up to 24 devices' per unit. The following table lists the allowable combinations of these units as a function of the system processor.

System Processor	Sys* Max	System Units Which May Have Display Printer Features
8130A	24	8101 or 8102
8130B	48	8130B and 8101 or 8130B and 8102 or 8101 and 8102 or two 8102s
8140A	48	8101 and 8102 or two 8102s
8140B	48	8140B and 8101 or 8140B and 8102 or 8101 and 8102 or two 8102s
8140C	48	8140C and 8101 or 8140C and 8102 or 8101 and 8102 or two 8102s
8150	48	8101 and 8102 or two 8102s

* Any combination of 3277 displays and 3284, 3286, 3287 or 3288 printers.

Communication Ports Feature (#1610): Two directly attached loops and two SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides for loop attachment in Ports 1 and 2 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Ports 3 and 4 provide a communication interface without clock to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9803 for port 3 and #9804 for port 4. Limitations: Not available with #1611, #1612, #1613 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1610	Direct-Attach Loop	Direct-Attach Loop	SDLC/EIA/CCITT	SDLC/EIA/CCITT

Communication Ports Feature (#1611): Three directly-attached loops and one SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides communication interface without clock to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9804 for port 4. Limitations: Not available with #1610, #1612, #1613 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Only two loops may be activated concurrently at 38,400 bps. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1611	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/EIA/CCITT

Communication Ports Feature (#1612): Three Loops and one SDLC/CCITT X.21 Switched interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400

bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides SDLC/CCITT X.21 switched interface without clock up to 48,000 bps -- with auto answer and auto call -- via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287. Limitations: Not available with #1610, #1611, #1613 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Either two loops at 38,400 bps, or one loop at 38,400 bps and the X.21 port at greater than 9600 bps may be activated concurrently. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1612	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/X.21 NonSw

Communication Ports Feature (#1613): Three Loops and one SDLC/CCITT X.21 nonswitched interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides SDLC/CCITT X.21 non-switched interface without clock up to 48,000 bps-point-to-point or multipoint-via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287. Limitations: Not available with #1610, #1611, #1612 or #1614. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Either two loops at 38,400 bps, or one loop at 38,400 bps and the X.21 port at greater than 9600 bps may be activated concurrently. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1613	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/X.21 NonSw

Communication Ports Feature (#1614): Three Loops and one SDLC/CCITT V.35 interfaces. Provides for loop attachment in Ports 1-3 with the speed selectable by switch at 9600 bps or 38,400 bps. Port 2 may be a two-lobe loop with the addition of #4835 and specify code #9873. Port 4 provides SDLC/CCITT V.35 interface without clock up to 56,000 bps to external modem with clock, or direct-connect with or without clock at 56,000 bps up to 1,000 ft or up to a total cable length of 200 ft to a 3705. Specify code #9684 for external modem, #9683 for direct-connect without clock, or #9682 with prerequisite multi-speed clock (#5200), for direct-connect with clock at 56,000 bps. Limitations: Not available with #1610, #1611, #1612 or #1613. Not available if high-speed (greater than 9600 bps) ports in an attached 8101. Either two loops at 38,400 bps, or one loop at 38,400 bps and the CCITT V.35 port at greater than 9600 bps may be activated concurrently. Maximum: One. Field Installation: Yes.

Special Feature	Port Position			
	1	2	3	4
#1614	Direct-Attach Loop	Direct-Attach Loop	Direct-Attach Loop	SDLC/V.35

Communication Ports Feature (#1620): One Low-Speed Loop and three SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28

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interfaces. Provides for loop attachment in Port 7 operating at 9600 bps. Port 7 may be a two-lobe loop with the addition of #4835 and specify code #9874. Ports 5, 6 and 8 provide a communication interface without clock to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9805 for port 5, #9806 for port 6 and #9808 for port 8. Limitations: Not available with #1621. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Special Feature	Port Position			
	5	6	7	8
#1620	SDLC/ EIA/ CCITT	SDLC/ EIA/ CCITT	Direct- Attach Loop	SDLC/ EIA/ CCITT

Communication Ports Feature (#1621): Four SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces. Provides communication interfaces in Ports 5-8. Ports 6, 7 and 8 are unlocked and attach to external modems with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Port 5 provides the same interface as Ports 6, 7 and 8, or direct connect at 4800 and 9600 bps up to 40 ft for Port 5. Specify code #9686 for 4800 bps or #9687 for 9600 bps with prerequisite multi-speed clock (#5200) for direct-connect with clock #9688 for direct-connect without clock; #9689 for external modem without LPDA; or #9805 for external modem with LPDA. Specify codes #9805, #9686, #9688, and #9689 are mutually exclusive. If LPDA is required for ports 6, 7 or 8, specify #9806 for port 6, #9807 for port 7, and #9808 for port 8. Limitations: Not available with #1620. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Special Feature	Port Position			
	5	6	7	8
#1621	SDLC/ EIA/ CCITT	SDLC/ EIA/ CCITT	SDLC/ EIA/ CCITT	SDLC/ EIA/ CCITT

Communication Ports Feature (#1622): One SDLC and three BSC EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 interfaces. Provides IBM microcode control for BSC communication interfaces in ports 5, 6, and 8 from 1200 to 9600 bps without clock or 600 and 1200 bps with clock to external DCE point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Port 5 also provides for direct-connect up to 40 ft. User parameter-selectable business machine clock options and speed at 1200, 1800, 3600, 4800, 7200 and 9600 bps are available. The attached terminal must not provide business machine clocking. Specify code #9690 for direct-connect with clock. The SDLC port 7 provides a communication interface without clock to an external DCE with clock to 9600 bps point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. If LPDA is required, specify #9807 for port 7. Limitations: Not available with #1620, #1621, or #1623. Mutually exclusive with 8101 BSC FAC codes 40, 41, 44, 45 on an 8100 system. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Special Feature	Port Position			
	5	6	7	8
#1622	BSC/ EIA/ CCITT	BSC/ EIA/ CCITT	SDLC/ EIA/ CCITT	BSC/ EIA/ CCITT

Communication Port Feature (#1623): Two BSC EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 interfaces. Provides IBM microcode control for BSC communication interfaces in ports 5 and 6 from 1200 to 9600 bps without clock or 600 and 1200 bps with clock to an external DCE point-to-point nonswitched 2- or 4-wire or multipoint nonswitched 4-wire. Limitations: Not available with #1620, #1621, or #1622. Mutually exclusive with 8101 BSC FAC codes 40, 41, 44, 45 on an 8100 system. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Special Feature	Port Position	
	5	6
#1623	BSC/ EIA/ CCITT	BSC/ EIA/ CCITT

Communication Ports Feature (#1630): Two SDLC/EIA interfaces. Provides for SDLC/EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interface without clock to external modem, with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire in Ports 9 and 10. If LPDA is required, specify #8801 for port 9, and #8802 for port 10. Limitations: Not available with #3220 or #4901. Maximum: One. Field Installation: Yes. Prerequisites: #1620, #1621, #1622 or #1623.

Special Feature	Port Position	
	9	10
#1630	SDLC/ EIA/ CCITT	SDLC/ EIA/ CCITT

Loop Adapter Second Lobe (#4835): Provides for the attachment of a separate physical loop cable to extend the coverage and availability of the directly attached loop. Maximum: Two. One for Port 2 and one for Port 7. Maximum is four per 8100 System. Field Installation: Yes. Prerequisites: #1610, #1611, #1612, #1613, #1614 or #1620. Specify: Code #9873 for Port 2 in Communication Ports Features #1610 through #1614 and #9874 for Port 7 in Communication Ports Feature #1620.

Multi-Speed Clock (#5200): Provides business machine clocking at 56,000 bps for direct-connect in Port 4 of Communication Ports Feature #1614 or business machine clocking at 4800 bps for Port 5 of Communication Ports Feature #1621. One must be ordered for each clocked port. Maximum: Two per 8140 mdl C72, C82 or C92. Field Installation: Yes. Prerequisites: #1614 or #1621.

MODEL CONVERSIONS

The following model changes can be field installed:

To C72 C82 C92

From

B52*	X	X	X
B62*	X	X	X
B72*	X	X	X
C72		X	X
C82			X

* For 8140 B mdl upgrades, order a preparation MES for steps 1 to 3 if required, and then order the upgrade MES for all items in step 4.

1. 8140 mdl BX1 without #4545 expanded function panel, order MES for: Mdl change to 8140 mdl BX2.
2. 8140 mdl BX1 with #4545 expanded function panel, order MES for: Remove #4545, and mdl change to 8140 mdl BX2.
3. 8140 mdl BX2 with #4545 expanded function panel, order MES for: Remove #4545.
4. 8140 mdl BX2, order MES for: Mdl change to 8140 C mdl --- removing all 8140 B mdl communication- and loop-associated feature codes and specify codes --- adding 8140 C mdl communication port and loop features as required. (Canada only) > For 8140 B mdls with 208V AC power -- remove specify code #9884 and add #9902 --- with 240V AC power -- remove #9894 and add #2831. In addition, remove #9886 for 1.8m (6 ft) cable. <)

The 8140 mdl B72 to C72 upgrade has a purchase price and can be ordered via standard MES. If the 8140 B72 to C72 upgrade customer requires communication ports or loop feature changes, a companion RPQ for such must accompany the upgrade MES.

Upgrades from 8140 BXX to B72 and C72 to CXX have purchase price and may be ordered via standard MES.

Additional communications cables may be required when converting 8140 mdl B to mdl C. For communication cable information, see the "8100 Information System Site Planning Guide", GA27-2884.

BSC, Start/Stop, integrated modems, PSNA communications features are not available in the 8140 mdls C72, C82, C92.

ACCESSORIES

CABLES - LOOP

Loop cables can be purchased from IBM or a customer-selected source. Two groups of cables are available from IBM:

- IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.
- Other Loop Cables - For loop implementation using non-IBM cabling system, the following cables are offered. See "IBM Multi-use Communication Loop Planning and Installation Guide", GA27-3341, for part numbers, specifications and usage which is necessary for preplanning and ordering.
- Indoor Cable P/N 1657265: UL-approved (style 2919) for interconnection of low voltage electronic equipment. Maximum allowable cable temperature range is -34 deg C to +80 deg C.
- Indoor Cable P/N 7838694: UL-approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34 deg C to +90 deg C.
- Indoor Cable P/N 7838695: UL-approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34 deg C to +105 deg C.

- Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34 deg C to +80 deg C.
- Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34 deg C to +80 deg C.
- Single Device Attachment Cable P/N 8269543: Maximum 12.1m (40 ft).

Ordering Instructions: Interior cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft.). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8m (1,000 ft.).

Exterior cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3000 ft), by specifying the length wanted. Outdoor splices with aerial and burial cable should be avoided. Order via MES from Fujisawa. Allow lead time of 120 days.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer-selected source. Two groups of accessories are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to IBM Cabling System - Planning and Installation Guide. For pricing and ordering information, refer to the System Supplies operation within your country. An "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other Loop Accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multi-use Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through an LWC to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

2 X 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered-off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called 'radials'. The point where a radial line terminates at the LWC is called an LWC 'port'. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a corresponding switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer-supplied volt-ohm meter, capable of reading 0.5 ohms and rated at least 5,000 ohms/volt, to verify the loop installation, including loop cabling and accessories, after completion. By plugging the tester into any loop station connector and connecting the volt-ohm meter to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

System Loop Accessories	Part Number
Order via MES from Raleigh:	
Loop Splice Plate (LSP)	
(indoor)	1657300
Loop Station Connector	
(Radial LSC)	1657310
Loop Station Connector	
(Wrap LSC)	1657320
Loop Station Connector Gasket	1657260
Loop Wiring Concentrator (LWC)	1657330
LWC Circuit Board Assy	
(order instead of LWC-1657330)*	1657332
Loop Surge Suppressor (LSS)	1657350
LSS Circuit Board Assy	
(order instead of LSS-1657350)*	1657354
Continuity and Relay Tester	1657420
Wrap Switch Access Cover	1657325
Loop Accessory Keys (10 spares)**	1657379
2 x 4 Adapter Plate (2AP)	7838771

Order via MES from Fujisawa:	
Conventional Box (indoor)	
5 x 10cm - (2 x 4 inches)	2102151
Clamp (for cable to indoor box)	2100264
Environmental Box	
(outdoor) 7x11.5cm - (2.75x4.5 inches)	
(For industrial use)	1657280
Environmental Clamp	
- small (for indoor	
cable to environmental box)	2114285
Environmental Clamp	
- large (for outdoor	
cable to environmental box)	1657377
Metric Conduit Adapter	1657292
Environmental Enclosure - NEMA - 4X	
36x30x15cm (14x12x6 in.)	1657305
Environmental Enclosure Mtg Pnl	1657306
Sealing - Locknut	1657307

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments) or as a replacement part for the LWC or LSS.

** One package (10 keys) shipped with each 8101 or 8140. One key shipped with each LWC and wrap LSC.

Ordering Instructions: Order via MES from location indicated above. When ordering use Machine type 8101 or 8140.

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories for terminal attachments.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuse Communications Loop Planning and Installation Guide", (GA27-3341) for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the Branch Office.

To enable a customer to test his installed loops, it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

Relocate/Replace Kits: (Except French Canadian and Spanish) The material required to perform machine relocation or processor replacement has been grouped into machine type dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101 or 8102 Storage and I/O units attached:

- Use Figure 1 below to order appropriate kit B/M
- 8140 kits apply to processor relocate or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1
Kits For Systems With 8101
or 8102 Attached - English

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	4448550	4448551	N/A
8101,8102			
(w/FC4525)	6226687	6226686	N/A
8140	4448556	4448557	4448558

* With packing material for units with upending feature (#9840) previously installed.

For 8100 Information Systems without 8101 or 8102 Storage and I/O units attached:

- Use Figure 2 below to order appropriate kit B/M.
- Kit is used for processor relocate or replace.

Figure 2
Kits For Systems Without
8101 or 8102 Attached

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	4448579	4448580	4448549

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226492	6226496	N/A
8101,8102 (w/FC4525)	6423302	6423301	N/A
8140	6226495	6226499	6226851

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - Spanish

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6226502	6226505	6226852

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101 or
8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6226590	6226594	N/A
8101,8102 (w/FC4525)	6423304	6423303	N/A
8140	6226593	6226597	6226849

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - French Canadian

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6226600	6226603	6226850

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems With 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8101,8102	6423295	6423296	N/A
8101,8102 (w/FC4525)	6423297	6423298	N/A
8140	6423287	6423288	6423289

* With packing material for units with upending feature (#9840) previously installed.

Kits For Systems Without 8101
or 8102 Attached - Japanese

Machine	Kit W/O Packaging Material	Kit W/ Packaging Material	Relocate Package*
8140	6423290	6423291	6423292

* With packing material for units with upending feature (#9840) previously installed.

- Check for missing/damaged wrap plugs. If required, see "Wrap Plugs" below.
- If up-ending is required to position the 8140, see "Upending Feature 8140" below.
- Ordering Information: (Canada only > Order from IBM. <)
(Except Canada and Japan > Order via MES from Raleigh. <)
(Japan only > Order via MES from Fujisawa. <)

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 3.

Figure 3

Comm Feature	Comm Cable Grp No.	Wrap Plug P/N
Loop Station Adapter (Single Lobe)	#3709	7389282
DDSA	#3717	6835350
V.35 Modem	#3718	6835348
V.35 Direct Connect	#3719	6835349
V.35 Direct-Connect Pt to Pt	#3720	6835642
EIA Direct Connect	#3721	6835642
EIA Modem	#3724	6835346
Loop Station Adapter (Double Lobe)	#3726	7389282
EIA Direct-Connect Pt to Pt	#3727	7389282
X.21	#3728	6835379

Ordering Information: Via Branch Office. Code 'S' from Mechanicsburg.

MACHINES

SUPPLIES (NONE)

DEVICE ATTACHMENT

Direct-Attached Devices: The following devices can attach directly to the processor:

- 3277 Display Station mdls 1, 2
- 3284 Printer mdls 1, 2
- 3286 Printer mdls 1, 2
- 3287 Printer mdls 1, 2

- 3288 Line Printer mdl 2
- 3732 Text Display Station
- 3736 Printer
- 8101, 8102 Storage and I/O Unit
- 8809 Magnetic Tape Unit

Loop-Attached Devices: The following devices can attach to a direct-attached loop or to a data link-attached (via the 3842 or 3843 Loop Control Unit) loop. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of the 8140 communication ports features.

Device and Mdl	Loop Attachment		
	Direct-At 9600 bps	38,400 bps	Data Link 2400, 4800,9600 bps
3104 Display Term'l mdl B1,B2	X	X	X
3230 Printer mdl 1	X	X	X
3232 Printer mdl 11	X	X	X
3262 Printermdls 2,12	(1)	X	(1)
3268 Printer mdl 1	X	X	X
3274 Control Unit mdl 51C,61C:	X	X	X
- 3178 Display Station			
- 3179 Color Display Station mdl 1			
- 3179 Color Grphcs Display Sta mdl G1, G2			
- 3180 Display Station mdl 1			
(available only when emulating a 3278)			
- 3230 Printer mdl 2			
- 3262 Printer mdls 3,13			
- 3262 Printer mdl 2			
- 3268 Printer mdl 1			
- 3278 Display Station mdls 1,2,3,4,5			
- 3279 Color Display Unit mdls 2A, 2B,3A,3B			
- 3287 Printer mdls 1,2,1C,2C			
- 3289 Printer mdls 1,2			
3274 Control Unit mdl 52C with:	X	X	X
- 3178 Display Station			
- 3180 Display Station mdl 1			
(available only when emulating a 3278)			
- 3262 Printer mdl 2			
- 3268 Printer mdl 2			
- 3278 Display Station mdls 1,2,52			
- 3283 Printer mdl 52			
- 3287 Printer mdls 1,2			
3276 Control Unit	X		X
Display Station			
mdls 11,12,13,14 w/:			
- 3178 Display Station			
- 3179 Color Display Station			
- 3180 Display Station mdl 1			
(available only when emulating a 3278)			
- 3230 Printer mdl 2			
- 3262 Printer mdl 13			
- 3268 Printer mdl 2			
- 3278 Display Station mdls 1,2,3,4			
- 3279 Color Display mdls 2A,2B,3A,3B			
- 3287 Printer mdls 1,2,1C,2C			
- 3289 Printer mdls 1,2			
3287 Printer mdls 11, 12	X	X	X
3289 Printer mdl 3 with:	(1)		(1)
- 2502 Card Reader mdl A1*			
- 3501 Card Reader			
- 3521 Card Punch*			
(*Requires 3782 Attachment Unit)			
3641 Reporting Terminal mdls 1,2	X		X
3642 Encoder Printer mdls 1,2	X		X
3643 Keyboard Display mdls 2,3,4	X		X

MACHINES

3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner			
Control Unit	X		X
3647 Time and Attendance Terminal	X		X
4701 Finance Communication			
Controller mdl 1	X	X	X
5210 Printer E1,E2	X		
7426 Terminal Interface Unit 1,			
w/assoc. term'ls	X	X	X
8775 Display Terminal mdls 1,2	X	X	X

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289 mdl 3, 3262 mdl 2 or 3262 mdl 12 printer should be considered in cases where the printer will be heavily utilized.

Communication-Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data, see the M2700 pages and appropriate machine pages for additional information. Refer to the "IBM 8100 Information System Configurator", GA27-2876, for selection of 8140 communication ports features.

Terminals conforming to 2780/3780 line protocol

- 3232 Printer mdl 1
- 3274 Control Unit mdl 51C,61C with:
 - 3178 Display Station
 - 3179 Color Display Station mdl 1
 - 3179 Color Graphics Display Station mdl G1, G2
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
- 3230 Printer mdl 2
 - 3262 Printer mdls 3,13
 - 3268 Printer mdl 2
 - 3278 Display Station mdls 1,2,3,4,5
 - 3279 Color Display Station mdls 2A,2B,3A,3B
 - 3287 Printer mdls 1,2,1C,2C
 - 3289 Line Printer mdls 1,2
- 3274 Control Unit mdl 52C with:
 - 3178 Display Station
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3268 Printer mdl 2
 - 3278 Display Station mdls 1,2,52
 - 3283 Printer mdl 52
 - 3287 Printer mdls 1,2
- 3276 Control Unit Display Station mdls 1*,2*,3*,4*,11,12, 13,14 with: (* These mdls are supported in SDLC mode)
 - 3178 Display Station
 - 3179 Color Display Station
 - (not supported on 3276 mdl 1)
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
- 3230 Printer mdl 2
 - 3262 Printer mdl 13
 - 3268 Printer mdl 2
 - 3278 Display Station mdls 1,2,3,4 (See M3276 for configuration details)

- 3279 Color Display Station mdls 2A,2B,3A,3B (Not supported on 3276 mdls 1,2,3,4)
- 3287 Printer mdls 1,2,1C,2C
- 3289 Line Printer mdls 1,2
- 3601 Finance Communication Controller mdls 1,2A,2B,3A,3B
- 3602 Finance Communication Controller mdls 1A,1B
- 3631 Plant Communication Controller mdls 1A,1B
- 3632 Plant Communication Controller mdls 1A,1B
- 3651 Store Controller mdls 25,75
- 3684 Point of Sale Control Unit mdls 1,2
- 3767 Communication Terminal mdls 1,2,3
- 3843 Loop Control Unit
- 4701 Finance Communication Controller mdl 1
- 4952 Processor
- 4954 Processor
- 4955 Processor
- 4959 Processor
- (Canada only > 5150 IBM Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6360, 6580 Display Writer (3270 DSC Mode only)
- 6670 Information Distributor mdls 1, 2
- 7426 Terminal Interface Unit mdl 2, with associated terminals
- 8101 Storage and I/O Unit
- 8130 Processor
- 8140 Processor
- 8150 Processor
- 8775 Display Terminal mdls 11,12

Direct-Connection Attachment: In addition to terminal attachment to the 8100 System through common carrier facilities (see M2700 pages), attachment can be made by direct-connect. The direct-connect is made by using Communication Ports Feature #1614 with specify #9682 or #9683, or #1621 with #9686 or #9688, or #1622 and #9690. Shown below are the direct-connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of direct-connect cables.

DIRECT-CONNECTED ATTACHABLE DEVICES

8140 Attaching Device	Speed (bps)	Attaching Device Feature No.	CXX Comm. Feature No.
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MACHINES

 Devices
 Conforming to
 2780/3780 Line
 Protocol

	1200	Refer to specific device	#1622, #9690
	1800		
	2400		
	3600		
	4800		
	7200		
	9600		
3232-1	4800	None	#1621, #5200 and #9686
3274-51C,61C	4800	#3701 and #6302	#1621, #5200 and #9686
	56,000	#1550 and #6303	#1614, #5200 and #9682
3276	4800	#3701 w #9491 and #6302	#1621, #5200 and #9686
3651*	4800	#2827	#1621, #5200 and #9686
25/75			#1621, #5200 and #9686
3705-II	4800	#4714	#1614, #5200 and #9682
	56,000	#2944	#1614, #5200 and #9682
3705-80	4800	None	#1621, #5200 and #9686
	56,000	#6712	#1614, #5200 and #9696
	56,000	#4931	#1614, #5200 and #9682
4701-1	4800	None	#1621, #5200 and #9686
4952,	4800	#2090	#1621, #5200 and #9686
4954,4955,4959			#1621, #5200 and #9686
6360	4800	#3707	#1621, #5200 and #9686
6580-A04, B04	4800	#3705	#1621, #5200 and #9686
6670-1,2	4800	#9420	#1621, #5200 and #9686
6670-2	9600	#9420	#1621, #5200 and #9687
7426-2	4800	None	#1621, #5200 and #9686
8101,8130	4800	FAC 17 (see Note)	#1621, #5200 and #9686
8140-AXX,BXX	4800	#1621 and #9688 (see Note)	#1621, #5200 and #9686
8140-CXX	56,000	FAC 28 (see Note)	#1614, #5200 and #9682
8101,			#1614, #5200 and #9682
8140-BXX	56,000	#1614 and #9683 (see Note)	#1614, #5200 and #9682
8140-CXX			#1621, #5200 and #9686
8150	4800	#1733 and #9688 or #1734 and #9698	#1621, #5200 and #9686
	9600	#1733 and #9688 or #1734 and #9698	#1621, #5200 and #9687
	56,000	#1742 and #9683 or #1745 and #9693	#1614, #5200 and #9682
8775	4800	#3701	#1621, #5200 and #9686

Note: FAC 17, 28, #1614 and #9683, or #1621 and #9688 in the attaching 8101, 8130, 8140 without business machine clock, or 8150 with #1733, #1734, #1742 or #1745.

Specify code #9770 is available to facilitate problem determination.

8150 PROCESSOR MODELS A10, A20, A30, A40, B20, B40, B60, B80

PURPOSE

The 8150 Processor provides higher performance and availability for the 8100 Information System. The 8150 A models have one Processing and Control Element (PCE); the 8150 B models have two PCEs with the capability of operating in dual mode or in single mode with either PCE. Each processor also includes processor storage, diskette storage, communications attachment, and 8101 and 8102 I/O attachment capabilities.

MODELS A10, A20, A30, A40, B20, B40, B60, B80

Models	Storage (Bytes)
A10	1MB (1,048,576)
A20	2MB (2,097,152)
A30	3MB (3,145,728)
A40	4MB (4,194,304)
B20	2MB (2,097,152)
B40	4MB (4,194,304)
B60	6MB (6,291,456)
B80	8MB (8,388,608)

Prerequisites: 8101 Storage and I/O Unit mdl A13, A23, or A25 or 8102 Storage and I/O Unit mdl A15 or A17.

Customer Setup (CSU): Yes. Machine only.

HIGHLIGHTS

The 8150 Processor is a multi-level, interrupt-driven processor which provides control, processing capability, processor storage, diskette storage, and communication features for the 8100 Information System. The flexibility offered by the 8150 Processor allows the user to configure a system for initial requirements, while retaining the ability to modify the system to meet future needs, with minimum disruption.

The 8150 Processor offers storage up to a maximum of 4MB (4,194,304) for the A mdls and 8MB (8,388,608) for the B mdls. This storage makes use of Error Correction Code (ECC) to provide correction of all single and most double-bit main storage errors. Capability for dynamic address translation and storage protection for up to 16 million bytes of logical storage is provided. Utilization of this logical storage is enhanced by a facility called "Keys and Locks". It allows much larger Common Address Space Section (CASS) and a significantly larger number of address spaces.

The 8150 A mdls have one PCE with a single I/O bus with all I/O attached to this bus. The 8150 B mdls have two PCEs and two I/O buses with the capability of operating in dual mode or in single mode with either PCE. The Diskette, Hardware Timer Facility, and Ports 1 through 6, as a group, may be enabled by the Operating System on either PCE. Ports 7 through 12 as a group may also be enabled on either PCE. Attached 8101s or 8102s with the Storage and I/O Unit Switch feature may be attached to both I/O buses (active on only one at a time). This dual bus and switching capability permits reconfiguring for higher availability.

A minimum of one 8101 or 8102 Storage and I/O Unit is required for use as the primary IPL device. Specify codes are required at the time of order so that the Primary IPL device address will be set in the 8150 Processor at the time of manufacture.

The 8150 Processor allows for the attachment of up to eight 8101 and/or 8102 Storage and I/O Units, or seven 8101, 8102 Storage and I/O Units and one 8809 Magnetic Unit mdl 1B. An alternate configuration can consist of an 8150 Processor, eight 8101, 8102 Storage and I/O Units, and one 8809 Magnetic Tape Unit mdl 1A. Up to three additional 8809 Magnetic Tape Units may be attached to the 8809 mdl 1A or 1B. A maximum of one 8101 may be configured with Communications and/or Display and Printer features. A maximum

of two 8102s may be configured with Display and Printer features. A maximum of two Display and Printer features may be configured per system.

Removable diskette storage is provided with up to 1MB (985,088 bytes) of storage operating at up to 62K bytes per second data rate. The diskette drive can read/write in basic data exchange format on either the Diskette 2D or the Diskette Type 1. A hardware timer facility provides a battery-backed Time-of-Day clock with a BCD clock calendar, system power on at a preset time and an optional feature for a Master Clock Synchronization (MCS) interface. The MCS interface is via a Start/Stop EIA RS 232-C, CCITT V.24/V.28 serial interface for attaching a customer-supplied external digital clock. The battery is a customer-installed accessory. (See "Accessories".)

The programmable system power down and the hardware timer facility power on will control the 8150 processor and the attached 8100 Storage and I/O unit(s).

The 8100 system can attach to any S/370, 4300, or 9370 processor via the 3704, 3705, 3720 or 3725 for SNA/SDLC or BSC line control. The 8100 system can attach to the communications adapter of the 4331 Processor for SDLC or BSC line control. See M2700 pages for specific attachment. The 8150 Processor provides for the attachment of a variety of input/output devices. These devices may be attached to the 8150 Processor via communication features which include data link, direct-connect, and loops that are direct-attached or data link-attached. Up to 12 communication and loop ports may be configured in an 8150 Processor.

Physical security is provided through the use of key locks on the operator panel and on the diskette drive. Additional or replacement keys are not available from IBM. They may be purchased from a local locksmith.

Customer Setup: The 8150 Processor is designated as a customer setup unit, thereby offering the customer early availability and relocation flexibility. Customer Setup instructions will be shipped with each machine. An 8150 Processor installation verification program will be shipped with each machine on a diskette. A clear indication that the machine is operational will be given.

Relocation/Replacement: If the user relocates the processor from one system to another or replaces the processor on an existing system the following conditions must be met:

1. Each 8101 and 8102 on the system must have a unique address code -- #9921, #9922, #9923, #9924, #9925, #9926, #9927, or #9928. There cannot be duplicate address codes on the same system.
2. The processor must have the correct address of the 8101 or 8102 that will be its primary IPL device. Refer to "Primary IPL Device Address" under specify below. For further information, see "IBM 8100 Information System Site Planning Guide", GA27-2884, and "8100 Hardware Migration Guide for DPPX/SP", GC23-0620.

For relocation/replace kit ordering, see "Relocate/Replace: 8100 System" under "Accessories".

Loop Installation: The customer is responsible for procurement, installation, and maintenance of the loop network. In order for the cable and required accessories to be properly installed, certain preparatory steps must be followed. See "IBM Multiuse Communication Loop Planning and Installation Guide", GA27-3341, for information necessary to plan and install the loop. The loop should be installed and checked out prior to attaching processors. The IBM Local Area Network Cabling System can be used for loop implementation. Refer to "IBM Cabling System - Planning and Installation Guide", GA27-3361. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Cabling: For loop cabling information, see Accessories and the "IBM Multiuse Communications Loop Planning and Installation

Guide", GA23-3341. For communication cable information, see the IBM "8100 Information System Site Planning Guide", GA27-2884. Communications cables must be ordered separately from the Communications Features.

Publications: GC20-8100

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

- **Power** (200V to 240V AC, 1-phase, 3-wire: For 50 Hz, specify #0805 for 60 Hz, specify #0806.

The power cable shipped with each machine will be 4.3m (14 ft) long. (Japan only) Specify #9890 for locking plug, #9891 for non-locking plug. If #9890 or #9891 are not specified, a cord without a plug will be shipped unless a country RPQ is initiated. <)

Note: (Except Japan) The 3-digit Country Code on the DP machine order sheet will be used to select a power plug which matches the most commonly used power supply in the country. <)

- **Color:** Pebble gray is the only available color.
- **Machine Nomenclature:**

Canadian French	#2935
English US	#2924
Spanish	#2931

- **Programming Configuration:** Specify #9700 for Distributed Processing Programming Executive (DPPX), #9710 for Distributed Processing Control Executive (DPCX), #9720 for DPPX and DPCX, or #9730 for all other configurations. Maximum: One. Field Installation: Yes.
- **Primary IPL Device Address:** The primary IPL device must be an 8101 or 8102 Storage and I/O Unit. You must specify #9935 for an 8101 mdl A13, A23, A25 or #9936 for an 8102 mdl A15 or A17. In addition, specify #9921, #9922, #9923, #9924, #9925, #9926, #9927 or #9928 using the same number as used on the 8101 or 8102 that will be the primary IPL device. #9939 is required for 8150 if attaching 8101/8102s in the range of #9925 thru #9928. Field Installation: The IPL Device Address can be changed by a CE. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES.
- **Extended Storage and I/O Unit Restrictions:** Up to six 8101, 8102s may be attached to an 8150 processor running under DPCX Release 5 and up to eight running under DPPX/SP2. When any Storage and I/O unit (8101 and/or 8102) is assigned an I/O address specify code in the range of #9925 thru #9928, the following limitations apply:
 1. 8101 mdls A10 and A20 cannot be assigned Specify codes #9925, #9926, #9927, or #9928.
 2. An 8101 with communications FAC and without Display and Printer Attachment (#1502 or #3220) is restricted to Specify code #9921.
 3. An 8101 with Display and Printer Attachment (#1502 or #3220) with or without communications FAC is restricted to either Specify code #9921 or #9922.
 4. An 8102 with Display and Printer Attachment (#3220) is restricted to Specify codes #9925 and/or #9926.
 5. If an 8102 with Specify code #9936 (first 8102 with #3220) is being relocated to an 8150 with any Storage and I/O units in the range of #9925 thru #9928, Specify code #9936 must be changed to #9925. Similarly, an 8102 with Specify Code #9937 (second 8102 with #3220) must be changed to #9926. Any units already assigned #9925 or #9926 must be changed to an unused Specify code.

6. An 8101/8102 with Specify Code #9928 and an 8809-1B are mutually exclusive.
7. Storage and I/O Unit Switch feature, #4525, is restricted to the first four addresses of the 8101/8102 Storage and I/O Units.

See "System Attachment" under "Specify" in 8101 and 8102 machine pages for additional information on system attachment Specify codes.

- **8101, 8809 mdl 1B Attachment:** If any installed 8101 will be attached to an 8150 Processor, an MES to remove specify code #9931 (8130 Attachment) or #9932 (8140 Attachment) and add #9933 (8150 Attachment) must be ordered for the 8101 to ensure the correct level of adapters and maintenance capability. If an 8809-1B will be attached to an 8150 Processor, an MES to add #9933 must be ordered for the 8809. The MES to add #9933 must be installed on the 8101 or 8809-1B prior to attachment to the 8150; installation of #9933 does not affect operation with the 8130 or 8140 and can be installed prior to the arrival of the 8150. (These MESs should be ordered and installed prior to attachment to an 8150. The units will operate when attached to an 8130 or 8140 processor.)

- **Industrial Automation Systems specify:**

— **Plant Floor Systems (#9010):** Collections or dissemination of data using plant floor terminals requiring human intervention, time and attendance, job reporting, etc., as well as automatically collected and disbursed data to and from programmable controllers, process controllers, etc. Also includes power management systems.

SPECIAL FEATURES

Performance: Higher performance is achievable if the communication ports in a system with an 8150 mdl B are configured in the 8150 Processor and not in an 8101 I/O Unit and ports 1 through 6 are utilized first. Note: The maximum number of communication and loop ports configured and capable of concurrent operation in an 8100 System is a function of the speed of the lines, communication facilities, the operating system installed and the application work load. The maximum number of communications and loop ports which can be physically installed can exceed the operational capability. The aid ANDPPX can be used to determine the operational capability of the system (processor utilization, storage requirements, and response times).

Multiple High-Speed Adapters: An 8150 Processor has the physical capability for eight high-speed communication ports in excess of 9600 bps. The maximum number of high-speed ports activated concurrently is limited to four on A mdls and four on each PCE on B mdls.

Diagnostics: The 8100 system hardware and feature operation, diagnostic support and maintenance support described in 8100 Information System publications are dependent on the presence of functional support modules provided by DPPX or DPCX. Customers ordering 8100 Information System hardware without these programs should provide the functional support as contained and described in the Functional Definition Manual 8100 which will be available from Mechanicsburg at FCS.

Floating Point Feature (#3750): Provides for execution of 30 floating point instructions and 32 floating point registers to improve performance of floating point operations (operates with only PCE 0 on B mdls). The instructions provide for loading, adding, subtracting, comparing, multiplying, dividing, storing and controlling the sign of short (4-byte) operands and long (8-byte) operands. Maximum: One. Field Installation: Yes.

Feature Expansion Prerequisite (#3901): Required for communications ports 7 through 12. This is a prerequisite for communication features #1716, #1726, #1734, #1735, #1745, #1755, and #1764. Maximum: One. Field Installation: Yes.

Multi-Speed Clock (#5200): Provides business machine clocking at 4800, 9600 and 56,000 bps for SDLC direct-connection facilities. Can provide multiple speeds simultaneously. One multi-speed clock can provide clocking for features #1733, port 5, and #1742, port 4, and another multi-speed clock can provide clocking for features #1734, port 8, and #1745, port 9. Maximum: Two. One for ports 4 and 5 and one for ports 8 and 9. Field Installation: Yes. Prerequisites: #1733, #1734, #1742, or #1745.

Master Clock Synchronization Interface (#5210): Provides a Start/Stop EIA RS 232-C, CCITT V.24/V.28 serial interface for attaching a customer-supplied external digital clock. For further information, see "IBM 8150 Processor Description", GA23-0122. For external cable ordering information, see "IBM 8100 System Site Planning Guide", GA27-2884. Maximum: One. Field Installation: Yes.

COMMUNICATIONS and LOOPS

The communication and loop attachments are available in line sets which occupy predefined ports. A maximum of 12 ports are available, however only 10 loops and SDLC lines may be activated at any one time on each PCE. If line sets are selected in ports 1 to 4 or 9 to 12, there can be no high-speed ports in an attached 8101. The speed of the loops in communication ports 1 to 4 and ports 11 and 12 is manually switch selectable at either 9600 bps or 38,400 bps. The limitation on the total number of active ports at greater than 9600 bps is four on A mdls and four on each PCE on B mdls. The loop speed in ports 11 and 12 in A mdls must be at 9600 bps.

Note: Within a given Communications Feature, the selected option Link Problem Determination Aid (LPDA) or line speed can be changed in the field by the CE. All such changes are chargeable at the applicable CE hourly rate. Do not submit an MES. However, the MES for removal of a Communications Feature and its associated specify codes must identify the original codes ordered from the factory.

For communication cable information, see the "IBM 8100 Information System Site Planning Guide", GA27-2884.

COMMUNICATION FEATURES

PORTS					
1	2	3	4	5	6
#1711	#1712	#1713			
Loop	Loop	Loop	Loop	SDLC	SDLC
				EIA	EIA
				*DC	
or		or		or	
#1721	#1732	#1763			
Loop	Loop	SDLC	SDLC	BSC	BSC
2-Lobe	2-Lobe	EIA	EIA	EIA	EIA
				*DC	

OR	
#1742	
SDLC	SDLC
V.35	V.35
	*DC

OR	
#1752	
SDLC	SDLC
X.21	X.21
Sw	Nonsw

#3901 Prerequisites

PORTS					
7	8	9	10	11	12
#1734	#1735	#1716			
SDLC	SDLC	SDLC	SDLC	LOOP	LOOP
EIA	EIA	EIA	EIA		
	*DC				

OR		OR		OR	
#1764	#1745	#1726			
BSC	BSC	SDLC	SDLC	LOOP	LOOP
EIA	EIA	V.35	V.35	2-Lobe	2-Lobe
	*DC	*DC			

OR	
#1755	
SDLC	SDLC
X.21	X.21
Nonsw	Sw

* DC = Direct Connect

Communications Feature (#1711): Provides for directly-attached loops with single lobes in ports 1 and 2 with the speed selectable by switch at 9600 bps or 38,400 bps. Limitations: Not available with #1721. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes.

Communications Feature (#1712): Provides for directly-attached loops with single lobes in ports 3 and 4 with the speed selectable by switch at 9600 bps or 38,400 bps. Limitations: Not available with #1732, #1742 or #1752. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes.

Communications Feature (#1713): Provides for directly-attached loops with single lobes in ports 11 and 12 with the speed selectable by switch at 9600 bps or 38,400 bps for B mdls. 9600 bps only for A mdls. Limitations: Not available with #1726. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Communications Feature (#1721): Provides for directly-attached loops with double lobes in ports 1 and 2 with the speed selectable by switch at 9600 bps or 38,400 bps. Limitations: Not available with #1711. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes.

Communications Feature (#1726): Provides for directly-attached loops with double lobes in ports 11 and 12 with the speed selectable by switch at 9600 bps or 38,400 bps for B mdls, 9600 bps only for A mdls. Limitations: Not available with #1716. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Communications Feature (#1732): Provides for two SDLC EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces in ports 3 and 4. Both interfaces are unlocked and attach to external modems with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Limitations: Not available with #1712, #1742, or #1752. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Specify: #9803 for port 3 with LPDA, #9804 for port 4 with LPDA.

Communications Feature (#1733): Provides for two SDLC EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces in ports 5 and 6. Port 6 is unlocked and attaches to an external modem with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Port 5 provides the same interface as Port 6 or direct-connect at 4800 bps or 9600 bps up to 40 feet. Limitations: Not available with #1763. Maximum: One. Field Installation: Yes. Specify: For port 5: #9689 for external modem, #9688 for direct connect without clock, #9686 with prerequisite multi-speed clock (#5200) for direct-connect with clock at 4800 bps or #9687 with prerequisite multi-speed clock (#5200) for direct-connect at 9600 bps. Specify #9805 for port 5 with LPDA, #9806 for port 6 with LPDA.

Communications Feature (#1734): Provides for two SDLC EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces in ports 7 and 8. Port 7 is unlocked and attaches to an external modem with clock up to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Port 8 provides the same interface as Port 7 or direct-connect at 4800 bps or 9600 bps up to 40 feet. Limitations: Not available with #1764. Maximum: One. Field Installation: Yes. Prerequisites: #3901. Specify: For Port 8: #9699 for external modem, #9698 for direct-connect without clock, #9696 with prerequisite multi-speed clock (#5200) for direct-connect with clock at 4800 bps or #9697 with prerequisite multi-speed clock (#5200) for direct-connect at 9600 bps. Specify #9807 for port 7 with LPDA, #9808 for port 8 with LPDA.

Communications Feature (#1735): Provides for two SDLC EIA RS-232-C/CCITT V.24/V.28 or CCITT X.21bis/V.28 interfaces in ports 9 and 10. Both interfaces are unlocked and attach to external modems with clock up to 9600 bps -- point-to-point switched with auto answer to 9600 bps -- point-to-point nonswitched 2- or 4-wire or multipoint 4-wire. Limitations: Not available with #1745 or #1755. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Prerequisites: #3901. Specify: #8801 for port 9 with LPDA, #8802 for port 10 with LPDA.

Communications Feature (#1742): Provides for two SDLC/CCITT V.35 interfaces in ports 3 and 4. Port 3 is unlocked and attaches to an external modem with clock up to 56,000 bps. Port 4 provides the same interface as Port 3 or direct-connect with or without clock at 56,000 bps for a total cable length of up to 1,000 feet. When attaching to a 3705 or 3725, there must be a clock at 56,000 bps with total cable length up to 200 feet for 3705 and 492 feet for 3725. Limitations: Not available with #1712, #1732 or #1752. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Specify: For Port 4: #9684 for external modem, #9683 for direct-connect without clock, #9682 with prerequisite multi-speed clock (#5200) for direct-connect with clock at 56,000 bps.

Communications Feature (#1745): Provides for two SDLC/CCITT V.35 interfaces in ports 9 and 10. 8150 mdl A ports 9 and 10 are unlocked and attach to an external modem with clock up to 9600 bps. 8150 mdl B port 10 is unlocked and attaches to an external modem with clock up to 56,000 bps. Port 9 provides the same interface as Port 10 or direct-connect with or without clock at 56,000 bps for a total cable length of up to 1,000 feet. When attaching to a 3705 or

3725, there must be a clock at 56,000 bps with total cable length up to 200 feet for 3705 and 492 feet for 3725. Limitations: Not available with #1735 or #1755. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Prerequisites: #3901. Specify: For Port 9: #9694 for external modem, #9693 for direct-connect without clock, #9692 with prerequisite multi-speed clock (#5200) for direct-connect with clock at 56,000 bps.

Communications Feature (#1752): (Except Canada) Provides one SDLC/CCITT X.21 Switched interface with auto answer and auto call in port 3 and one SDLC/CCITT X.21 nonswitched interface point-to-point or multipoint in port 4, without clock up to 48,000 bps via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287. Limitations: Not available with #1712, #1732 or #1742. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes.

Communications Feature (#1755): (Except Canada) Provides one SDLC/CCITT X.21 Switched interface with auto answer and auto call in port 10 and one SDLC/CCITT X.21 nonswitched interface point-to-point or multipoint in port 9, without clock up to 9600 (A mdls) or 48,000 bps (B mdls) via a Data Circuit-Terminating Equipment (DCE) which complies with CCITT Recommendation X.21 as it is delineated in GA27-3287. Limitations: Not available with #1735 or #1745. Not available if high-speed (greater than 9600 bps) ports are in an attached 8101. Maximum: One. Field Installation: Yes. Prerequisites: #3901.

Communications Feature (#1763): Provides two BSC EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 interfaces in ports 5 and 6. Port 6 provides an IBM microcode-programmed BSC communication interface from 1200 to 9600 bps without clock or 600 and 1200 bps with clock to external Data Circuit-Terminating Equipment (DCE) point-to-point nonswitched 2- or 4-wire or multipoint nonswitched 4-wire. Port 5 provides the same interface as port 6 or direct-connect up to 40 feet. Limitations: Not available with #1733. Not available if BSC FAC Codes 40, 41, 44, 45 are in an attached 8101. Field Installation: Yes. Specify: For Port 5: #9690 for direct-connect. User parameter selectable business machine clock options and speed are available at 1200, 1800, 2400, 3600, 4800, 7200, or 9600 bps. The attached terminal must not provide business machine clocking.

Communications Feature (#1764): Provides two BSC EIA RS-232-C/CCITT V.24/V.28, CCITT X.21bis/V.28 interfaces in ports 7 and 8. Port 7 provides an IBM microcode-programmed BSC communication interface from 1200 to 9600 bps without clock or 600 and 1200 bps with clock to external Data Circuit-Terminating Equipment (DCE) point-to-point nonswitched 2- or 4-wire or multipoint nonswitched 4-wire. Port 8 provides the same interface as port 7 or direct-connect up to 40 feet. User parameter selectable business machine clock options and speed are available at 1200, 1800, 2400, 3600, 4800, 7200, or 9600 bps. The attached terminal must not provide business clocking. Limitations: Not available with #1734. Not available if BSC FAC Codes 40, 41, 44, 45 are in an attached 8101. Field Installation: Yes. Specify: For Port 8: #9680 for direct-connect.

MODEL CONVERSIONS

The following model changes can be field installed:

	To A20	A30	A40	B20	B40	B60	B80
From							
A10	X	X	X				
A20		X	X	X*			
A30			X				
A40					X*		
B20					X	X	
B40						X	X
B60							X

* Purchase only. The 8150 model A20 being upgraded to the model B20 and Model A40 being upgraded to the Model B40 must be a purchased machine.

ACCESSORIES

Mercury Battery (P/N 1743456): Provides power to the timer facility when the utility power is not present or when the Unit Emergency switch is in the Power Off position. This is a 4.14 volt non-rechargeable mercury battery that is warranted for 90 days from the date of shipment, has a shelf life of 1 year under normal conditions, and can be expected to provide 3.5 years of normal operation. One battery is supplied at no additional extra charge with the initial order. Additional or replacement batteries may be ordered from IBM. Discharged batteries should be returned to IBM for disposal. Return information is printed on the label of the battery. Field Installation: Yes, by the customer.

CABLES - LOOP

Loop cables can be purchased from IBM or a customer selected source. Two groups of cables are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information, refer to the System Supplies operation within your country. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other loop cables - For loop implementation using non-IBM cabling system, the following cables are offered. Refer to "IBM Multiuse Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, and for installation and testing information.

- Indoor Cable P/N 1657265: UL approved (style 2919 for inter-connection of low voltage electronic equipment. Maximum allowable cable temperature range is -34 deg C to 80 deg C.
- Indoor Cable P/N 7838694: UL approved for cable tray installation (NEC Art. 725-40b3). Maximum allowable cable temperature range is -34 deg C to 90 deg C.
- Indoor Cable P/N 7838695: UL approved for duct and plenum installation (NEC Art. 725-2b). Maximum allowable cable temperature range is -34 deg C to 105 deg C.
- Outdoor Cable P/N 1657267: For above ground installation. Maximum allowable cable temperature range is -34 deg C to 80 deg C.
- Outdoor Cable P/N 1657268: For below ground installation. Maximum allowable cable temperature range is -34 deg C to 80 deg C.

Ordering Instructions: Indoor cable (P/N 1657265, 7838694 and 7838695) should be ordered in lengths of 304.8m to 609.6m (1,000 to 2,000 ft). Additional lengths up to 609.6m (2,000 ft.) can be ordered by specifying the length wanted. Indoor cable splices can be accomplished via P/N 1657300. A minimum order quantity is 304.8m (1,000 ft). Outdoor cable (P/Ns 1657267 and 1657268) should be ordered in one continuous length, up to a maximum of 914.4m (3,000 ft), by specifying the length wanted. Outdoor splices with aerial and burial cable should be avoided.

Warranty: Loop cable is warranted free from defects of workmanship and materials for 90 days.

LOOP - ACCESSORIES

Loop accessories can be purchased from IBM or a customer selected source. Two groups of accessories are available from IBM:

IBM Cabling System - For proper identification, installation, and application of cable and accessories, refer to "IBM Cabling System - Planning and Installation Guide". For pricing and ordering information,

refer to the System Supplies operation within your country. An updated "8100 Information System Maintenance Manual", SY27-2521, should be requested by the 8100 servicing organization.

Other loop accessories - For loop implementation using non-IBM cabling system, the following accessories are offered. Refer to "IBM Multiuse Communications Loop Planning and Installation Guide", GA23-3341, for information necessary to plan the layout and for selection of the loop hardware, and for installation and testing information.

Loop Splice Plate (LSP): The LSP splices together two segments of indoor cable or provides a connecting point for future expansion of the loop. The LSP consists of a single connector strip, to which the incoming loop cable and the outgoing loop cable can be attached; it is installed in a standard outlet box for business office environments, or weatherproof outlet box for industrial environments.

Loop Station Connector (LSC): The LSC is available as two unique types: Wrap and Radial. The wrap LSC attaches an I/O unit or controller directly to the main loop cable; the radial LSC attaches an I/O unit only through a Loop Wiring Concentrator (LWC) to the loop. The wrap LSC attaches an incoming and outgoing loop cable; the radial LSC attaches at the end of one loop cable from the LWC.

The wrap LSC also offers the isolation feature of wrapping, which allows the customer to wrap the loop away from a loop wiring failure or to reconfigure the loop during alterations. Both wrap and radial LSCs contain bypass relays that bypass the I/O unit when the I/O unit is powered off or disconnected. These accessories are installed in a standard or weatherproof outlet box.

2 x 4 Adapter Plate (2AP): The 2" x 4" Adapter Plate is used with the Loop Station Connector and accommodates the use of standard outlet boxes that have dimensions smaller than the outlet boxes defined in the "Loop Installation and Planning Guide". It is not to be used with the environmental outlet boxes.

Loop Wiring Concentrator (LWC): The LWC provides the facility to attach a cluster of I/O units without a large number of drops on the loop cable. It attaches up to eight radial LSCs at the end of loop cables called radials. The point where a radial line terminates at the LWC is called an LWC port. Not all ports have to be used; unused ports can be reserved for future expansion.

The LWC has the same wrapping capability as the wrap LSC. In addition, the LWC allows the customer to bypass one or more of the radials by setting a switch located inside the LWC.

The LWC has its own enclosure or can be mounted in a NEMA-4X environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Loop Surge Suppressor (LSS): The LSS allows the loop to be run across an outdoor space to another building. It attaches two outdoor cables and two indoor cables, allowing the proper termination and grounding for each type of cable. In addition, the LSS contains four surge protectors, one for each twisted pair in the two outdoor cables, to protect from voltage surges caused by near strikes of lightning. There is no protection in the LSS from a direct lightning strike.

The LSS has its own enclosure or can be mounted in an environmental equipment cabinet, with minimum measurement of 36x30x15cm (14x12x6 in.).

Continuity And Relay Tester: The Continuity and Relay Tester is used with a customer-supplied volt-ohm meter, capable of reading 0.5 ohms and rated at least 5,000 ohms/volt, to verify the loop installation, including loop cabling and accessories after completion. By plugging the tester into any loop station connector and connecting the volt-ohm meter to the tester, the condition of the wire segment being tested can be determined as to conductor and shield continuity (opens or shorts), wrap switch operation, and total lobe resistance.

The loop station connector relays are also activated and their operation verified with this tester.

System Loop Accessories	P/N
Order via MES from Raleigh:	
Loop Slice Plate (LSP) (indoor)	1657300
Loop Station Connector (Radial LSC)	1657310
Loop Station Connector (Wrap LSC)	1657320
Loop Station Connector Gasket	1657260
Loop Wiring Concentrator (LWC)	1657330
LWC Circuit Board Assy	
(order instead of LWC - 1657330)*	1657332
Loop Surge Suppressor (LSS)	1657350
LSS Circuit Board Assy	
(order instead of LSS - 1657350)*	1657354
Continuity and Relay Tester	1657420
Wrap Switch Access Cover	1657325
Loop Accessory Keys (10 spares)**	1657379
2 x 4 Adapter Plate (2AP)	7838771
Order via MES from Fujisawa:	
Conventional Box (indoor)	
5 x 10cm - (2 x 4 in.)	2102151
Clamp (for cable to indoor box)	2100264
Environmental box	
(outdoor) 7 x 11.5cm - (2.75 x 4.5 in.)	
(For industrial use)	1657280
Environmental Clamp - small	
(for indoor cable to environmental box)	2114285
Environmental Clamp - large	
(for indoor cable to environmental box)	1657377
Metric conduit adapter	1657292
Environmental Enclosure - NEMA - 4X	
36 x 30 x 150cm (14 x 12 x 6 in.)	1657305
Environmental Enclosure Mtg Panel	1657306
Sealing - Locknut	1657307
Single Device Attach. Cable, 12.1m (40 ft)	8269543

* For use with NEMA-4X enclosure and associated parts (used when installing in harsh environments or as a replacement part for the LWC or LSS.

** 1 package (10 keys) shipped with each 8101 or 8150. 1 key shipped with each LWC and wrap LSC.

- Use Figure 1 below to order appropriate kit.
- 8150 kits apply to processor relocation or replace.
- Each 8101 or 8102 to be relocated requires a kit. Current CSU Diskette provided with each kit.

Figure 1

Warranty: All loop accessories are warranted free from defects of workmanship and materials for 90 days.

Customer Responsibilities: The customer is responsible to provide (purchase, install, test, and maintain) the loop cables and accessories. However, see IBM for contracts available to assist the customer with installation.

The customer is also responsible for procuring and stocking spare cable and spare parts for loop accessories.

See "IBM Multiuse Communications Loop Planning and Installation Guide" (GA27-3341) for a suggested schedule to allow the customer to plan, install, and test the loop cable and accessories prior to delivery of the system.

It is recommended that the customer order additional loop components for spares with the initial order, as spares will not be stocked in the branch office.

To enable a customer to test his installed loops it is recommended that the customer order a Continuity and Relay Tester. Testing the loop wiring will require the tester or its equivalent.

SYSTEM ACCESSORIES

Relocate/Replace Kits: (Except French Canadian and Spanish) The material required to perform machine relocation or processor replacement has been grouped into machine type dependent kits. Kits are available with or without truck-move packaging material.

For 8100 Information Systems with 8101, 8102 Storage and I/O units attached:

Kits For Systems With 8101 or 8102 Attached - English

Machine	Kit Without Packaging Material	Kit With Packaging Material
8101, 8102	4448550	4448551
8101, 8102 (w/FC4525)	6226687	6226686
8150	4719031	4719032

Kits For Systems With 8101 or 8102 Attached - Spanish

Machine	Kit Without Packaging Material	Kit With Packaging Material
8101, 8102	6226492	
8101, 8102 (w/FC4525)	6423302	6423301
8150	4719144	4719141

Kits For Systems With 8101 or 8102 Attached - French Canadian

Kit Without Kit With

Figure 2

Machine	Packaging Material	Packaging Material
8101, 8102	6226590	6226594
8101, 8102 (w/FC4525)	6423304	6423303
8150	4719140	4719139

Kits For Systems With 8101
or 8102 Attached - Japanese

Machine	Kit Without Packaging Material	Kit With Packaging Material
8101, 8102	6423295	6423296
8101, 8102 (w/ FC4525)	6423297	6423298
8150	6423293	6423294

- Check for missing/damaged wrap plugs. If required, see the wrap plug entry below.

WRAP PLUGS

The communication cables listed below will require their respective wrap plugs to be re-installed for machine relocations.

If wrap plugs are lost or damaged, you may order replacements by the part numbers specified in Figure 2.

Communication Feature	Comm Cable Group Number	Wrap Plug P/N
Loop Station Adapter (Single Lobe)	#3709, #4838	7389282
DDSA	#3717	6835350
V.35 Modem	#3718, #4840	6835348
V.35 Direct Connect	#3719, #4841	6835349
V.35 Direct Connect PTP	#3720, #4830	6835353
EIA Direct Connect	#3721, #4833	6835642
EIA Modem	#3724	6835346
Loop Station Adapter (Double Lobe)	#3726, #4839	7389282 (2 Req'd)
EIA Direct Connect PTP	#3727, #4835	6835347
X.21 Nonswitched	#3728	6835379
X.21 Switched	#3733, #4836	6226830
V.35 Direct Connect PTP	#4829	4718959
EIA Direct Connect PTP	#4834	4718958

SUPPLIES

None required with machine order.

DEVICE ATTACHMENT

Direct Attached Devices: The following devices can be directly attached to the processor:

8101 Storage and I/O Unit
8102 Storage and I/O Unit
8809 mdl-1B Magnetic Tape Unit

Loop Attached Devices: The following devices can attach to a direct-attached loop or a data link-attached loop via the 3842 or 3843 Loop Control Unit.

LOOP ATTACHMENT

Device and Mdl	Direct-At 9600 bps	38,400 bps	Data Link At 2400,4800, 9600 bps
3104 Display Terminal B1,B2	X	X	X
3262 Printer mdls 2,12	(1)	X	(1)
3268 Printer mdl 1	X	X	X
3274 Control Unit mdls 51C,61C with:	X	X	X
- 3178 Display Station			
- 3179 Display Station mdl 1			
- 3179 Color Grphcs Display Sta mdl G1, G2			
- 3262 Printer mdls 3,13			
- 3268 Printer mdl 2			
- 3278 Display Station mdls 1,2,3,4,5			
- 3278 PC Attach			
- 3279 Color Display mdls 2A,2B,3A,3B			
- 3287 Printer mdls 1,2,1C,2C			
- 3289 Printer mdls 1,2			
- 3290 Information Panel			
- 5210 Printer mdls G1,G2			
- 6580 Displaywriter w/3270 AW			
3274 Control Unit mdl 52C with:	X	X	X
- 3178 Display Station			

- 3268 Printer mdl 2			
- 3278 Display Station mdls 1,2,52			
- 3283 Printer mdl 52			
- 3287 Printer mdls 1,2			
- 6580 Displaywriter w/3270 AW			
3276 Control Unit Display Station mdls 11,12,13,14 with:	X		X
- 3178 Display Station			
- 3262 Printer mdl 13			
- 3268 Printer mdl 2			
- 3278 Display Station mdls 1,2,3,4			
- 3278 PC Attach			
- 3279 Color Display mdls 2A,2B,3A,3B			
- 3287 Printer mdls 1,2,1C,2C			
- 3289 Line Printer mdls 1,2			
- 5210 Printer mdls G1,G2			
- 6580 Displaywriter w/3270 AW			
3287 Printer mdls 11,12	X	X	X
3289 Printer mdl 3 with:	(1)		(1)
- 2502 Card Reader mdl A1*			
- 3501 Card Reader			
- 3521 Card Punch*			
(* Requires 3728 Attachment Unit)			
3641 Reporting Terminal mdls 1,2	X		X
3642 Encoder Printer mdls 1,2	X		X
3643 Keyboard Display mdls 2,3,4	X		X
3644 Automatic Data Unit	X		X
3645 Printer	X		X
3646 Scanner Control Unit	X		X
3647 Time and Attendance Terminal	X		X
4701 Finance Communication Control mdl 1	X	X	X
5210 Printer mdls E1,E2	X		
7426 Terminal Interface Unit mdl 1, with associated terminals	X	X	X
8775 Display Terminal 1,2	X	X	X

Note 1: Dedication of a 9600 bps single-lobe loop to the attachment of the 3289 mdl 3, 3262 mdl 2 or 3262 mdl 12 printer (when attached to a 9600 bps loop) should be considered in cases where the printer will be heavily utilized.

Communication Attached Devices: The following devices can attach to the communication ports. For communication facilities and modem attachment data, see the M2700 pages and appropriate machine pages for additional information.

- Terminals Conforming to 2780/3780 line protocol
- 3274 Control Unit mdl 41C, 51C, 61C with
 - 3178 Display Station
 - 3179 Display Station mdl 1
 - 3179 Color Graphics Display Station mdl G1, G2
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3262 Printer mdls 3, 13
 - 3268 Printer mdl 2
 - 3278 Display Station mdls 1, 2, 3, 4, 5
 - 3278 PC Attach
 - 3279 Color Display mdls 2A, 2B, 3A, 3B
 - 3287 Printer mdls 1, 2, 1C, 2C
 - 3289 Printer mdls 1, 2
 - 3290 Information Panel
 - 5210 Printer mdls G1,G2
 - 6580 Displaywriter w/3270 AW
- 3274 Control Unit mdl 52C with:
- 3178 Display Station
- 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3268 Printer mdl 2
 - 3278 Display Station mdls 1, 2, 52
 - 3283 Printer mdl 52

- 3287 Printer mdls 1, 2
- 6580 Displaywriter w/3270 AW
- 3276 Control Unit Display Station mdls 1*, 2*, 3*, 4*, 11, 12, 13, 14 with: (*These mdls are supported in SDLC mode)
 - 3178 Display Station
 - 3180 Display Station mdl 1 (available only when emulating a 3278)
 - 3262 Printer mdl 13
 - 3268 Printer mdl 2
 - 3278 Display Station mdls 1, 2, 3, 4 (See M3276 pages for configuration details)
 - 3279 Color Display mdls 2A, 2B, 3A, 3B (Not supported on 3276 mdls mdls 1, 2, 3, 4)
 - 3287 Printer mdls 1, 2, 1C, 2C
 - 3289 Line Printer mdls 1, 2
 - 5210 Printer mdls G1, G2
 - 6580 Displaywriter w/3270 AW
- 3601 Finance Communication Controller mdls 1, 2A, 2B, 3A, 3B
- 3602 Finance Communication Controller mdls 1A, 1B
- 3631 Plant Communication Controller mdls 1A, 1B
- 3632 Plant Communication Controller mdls 1A, 1B
- 3651 Store Controller mdls 25, 75
- 3684 Point of Sale Control Unit mdls 1, 2
- 3705-II. 80 Communications Controller
- 3725 Communication Controller
- 3767 Communication Terminal mdls 1, 2, 3
- 3842 Loop Control Unit
- 3843 Loop Control Unit

- 4701 Finance Communication Controller mdl 1
- 4952, 4954, 4955, 4959 Processor (Series/1)
- (Canada only > 5150 Personal Computer <)
- 5285, 5288 Programmable Data Stations
- 6580 Displaywriter (3270 DSC load only)
- 6670 Information Distributor
- 7426 Terminal Interface Unit mdl 2, with associated terminals
- 8101 Storage and I/O Unit

- 8130 Processor
- 8140 Processor
- 8150 Processor
- 8775 Display Terminal mdls 11, 12

Direct-Connection Attachment: In addition to device attachment to the 8100 System through common carrier facilities (see M2700 pages), attachment can be made by direct-connect. Shown below are the direct-connect attachable devices and required device feature numbers. The "8100 Information System Site Planning Guide", GA27-2884, will assist in the selection of cables.

DIRECT-CONNECTED ATTACHABLE DEVICES

Attaching Device	Speeds (bps)	Attaching Device Feature Number	8150 Comm. Feature Number
Devices Conforming to 2780/3780 Line Protocol	9600	Refer to Device	#1763 and #9690
3274-41C, 51C, 61C	4800	#3701 and #6302	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#3701 and #6302	#1733, #5200, and #9687 #1734, #5200, and #9697
	56,000	#1550 and #6303	#1742, #5200, and #9682 #1745 **, #5200, and #9692
3276	4800	#3701 w #9491 and #6302	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#3701 w #9491 and #6302	#1733, #5200, and #9687 #1734, #5200, and #9697
3651-25/75 *	4800	#2827	#1733, #5200, and #9686 #1734, #5200, and #9696
3705-II	4800	#4714	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#4714	#1733, #5200, and #9687 #1734, #5200, and #9697
	56,000	#2944	#1742, #5200, and #9682 #1745 **, #5200, and #9692
3705-80	4800	None	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	None	#1733, #5200, and #9687

	56,000	#6712	#1734, #5200, and #9697 #1742, #5200, and #9682 #1745**, #5200, and #9692
3725-1,2	4800	#4911	#1733, #5200 and #9686 or #1734, #5200 and #9696
	9600	#4911	#1733, #5200 and #9687 or #1734, #5200 and #9697
	56,000	#4931	#1742, #5200 and #9682 or #1745**, #5200 and #9692
4701-1	4800	None	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	None	#1733, #5200, and #9687 #1734, #5200, and #9697
4952, 4954, 4955, 4959	4800	#2090	#1733, #5200, and #9686 #1734, #5200, and
#9696	9600	#2090	#1733, #5200, and #9687 #1734, #5200, and #9697
6360	4800	#3707	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#3707	#1733, #5200, and #9687 #1734, #5200, and #9697
6580-A04, A10, B04, B10	4800	#3705	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#3705	#1733, #5200, and #9687 #1734, #5200, and #9697
6670	4800	#3701	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#3701	#1733, #5200, and #9687 #1734, #5200, and #9697
7426-2	4800	None	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	None	#1733, #5200, and #9687 #1734, #5200, and #9697

MACHINES

8101, 8130 8140-AXX/BXX	4800	FAC 17 (see Note)	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	FAC 17 (see Note)	#1733, #5200, and #9687 #1734, #5200, and #9697
8140-CXX	4800	#1621 and #9688 (see Note)	#1733, #5200, and #9686 #1734, #5200, and #9696
	56,000	#1614 and #9683 (see Note)	#1742, #5200, and #9682 #1745**, #5200, and #9692
8101, 8140-BXX	56,000	FAC 28 (see Note)	#1742, #5200, and #9682 #1745, #5200, and #9692
8775	4800	#3701	#1733, #5200, and #9686 #1734, #5200, and #9696
	9600	#3701	#1733, #5200, and #9687 #1734, #5200, and #9697

Note: FAC 17, 28, #1614 with #9683, or #1621 and #9688 in the attaching 8101, 8130, 8140 without business machine clock.

* Specify code #9770 is available on the 3651-25/75 to facilitate problem determination.

** Available on 8150 mdl B only.

8218 TOKEN-RING NETWORK COPPER REPEATER

PURPOSE

The 8218 Token-Ring Network Copper Repeater is a repeater designed to operate on IBM Cabling System data grade media for the IBM Token-Ring Network to extend the allowable distance between IBM 8228 Multistation Access Units up to 750m.

MODELS

Model 001: 100V, 60 Hz, P/N 6339532

Model 002: 100V, 50 Hz, P/N 6339533

Model 003: 200V, 50 Hz, P/N 6339534

Customer Setup: Yes. One day setup allowance. Setup instructions are included with each unit.

HIGHLIGHTS

The 8218 Mdl 001 is a copper repeater associated with the IBM Token-Ring Network to extend the 4MB per second data transmission path on the IBM Cabling System data grade media. The 8218s can drive the electrical data transmission signals up to 750m between 8228s typically installed in wiring closets. Operating in pairs, 8219s redrive electrical signals on both the main ring path and backup path. (Two Crossover Patch Cables are required for each pair of repeaters.) An individual 8218 amplifies and reclocks data transmission signals along the token-rings.

Typically, these units would be installed in standard 19-inch racks or attached to flat surfaces such as walls or shelves. Rack installations require a Rack Mounting Assembly which accommodates up to seven individual 8218 units. The 8218 may be installed in or removed from a Rack Mounting Assembly without powering down other 8218s in the same assembly. A single power outlet is required to service a Rack Mounting Assembly which accommodates up to seven repeaters. (The Rack Mounting Assembly accommodates a mix of 8218s or 8219 Token-Ring Optical Fiber Repeaters or both.)

Flat surface installation of the 8218 requires the Surface Mounting Brackets accessory for attaching units to walls or shelves. Individual 8218s snap easily into and out of the bracket.

8218s can operate in an IBM Token-Ring Network environment which has Telephone Twisted-Pair media that meets the IBM Cabling System Type 3 specified media installed. In this environment, two Data Grade Media to Type 3 Filters are required where 8218s are used between 8228s and Type 3 specified media is installed from the office to the wiring closet. (Refer to "IBM Token-Ring Network Telephone Twisted-Pair Media Guide", GA27-3714, NDD 69X7824. The Data Grade Media to Type 3 Filters are not available from IBM.

Customer Responsibilities

The customer is responsible for planning the network configuration, installing the cabling system, setting up the repeaters, connecting the repeaters into a network, performing customer problem analysis and resolution (CPAR) procedures, maintaining accurate configuration charts, and labeling all devices and cables. (Reference "IBM Token-Ring Network Introduction and Planning Guide", GA27-3677.)

Warranty: One year.

Publications: The following publications are available:

- "IBM Token-Ring Network Introduction and Planning Guide", GA27-3677.* Information is for developing an installation plan for the local area network.
- "IBM Token-Ring Network Telephone Twisted-Pair Media Guide", GA27-3714.* Contains component descriptions, limitations, Type 3 media specifications, and planning and installation information for implementing the IBM Token-Ring Network on telephone twisted-pair media.
- "IBM Cabling System Planning and Installation Guide", GA27-3361. Information is provided to assist the customer in planning, installing, and testing the cabling system. (Type 3 media information not included.)
- "IBM Token-Ring Network Installation Guide", GA27-3678.** Contains instructions for the installation of the local area network using the previously installed data grade media. (Type 3 media information not included.)
- "IBM Token-Ring Network Problem Determination Guide", SX27-3710.** A step-by-step description of the procedures used to isolate and resolve network failures, including operational instructions for use of the ring diagnostic program. (Type 3 media information not included.)
- "IBM Token-Ring Network Administrator's Guide", GA27-3748.** This publication provides information to assist the administrator of the IBM Token-Ring Network for evaluating and improving the performance of a ring during and after installation is discussed.

* Available April 1986.

** Available June 1986.

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

ACCESSORIES

Description	Feature Number	Part Number
Rack Mounting Assembly	3001	6339139
Surface Mounting Brackets	3002	6339140
Crossover Patch Cable	--	6339137
Data Grade Media to Type 3 Filter	--	6466943

SUPPLIES (NONE)

8219 TOKEN-RING NETWORK OPTICAL FIBER REPEATER

PURPOSE

The 8219 Token-Ring Network Optical Fiber Repeater is an optical fiber repeater for the IBM Token-Ring Network which extends the allowable distance between IBM 8228 Multistation Access Units up to 2.0km. Optical fiber repeaters operate in pairs to convert data signals from electrical to optical and back. Greater distances are achievable by installing additional pairs of 8219s.

MODELS

Model 001: 100V, 60 Hz, P/N 6339535

Model 002: 100V, 50 Hz, P/N 6339536

Model 003: 200V, 50 Hz, P/N 6339537

Customer Setup: Yes. One day setup allowance.

HIGHLIGHTS

The 8219 is an optical fiber repeater for the Token-Ring Network which extends the allowable distance between 8228 Multistation Access Units up to 2.0km with a continuous fiber cable. Greater distances are achievable when additional pairs of 8219s are inserted along the fiber link. The 8219 supports the IBM Cabling System Type 5 optical fiber cable (100/140 micron) Type 5J (50/125 micron) and can be operated with other optical fiber sizes such as 62.5/125, 50/125, 85/125 micron. Configuration planning information for determining drive distances for various types of optical fiber cable is supplied in the "IBM Token-Ring Network Optical Fiber Cable Option", GA27-3747, NDD 69X7823.

By operating in pairs, one 8219 Token-Ring Network Optical Fiber Repeater converts electrical data transmission signals to optical signals in the main ring path of the network and the second converts the optical signals back to electrical signals. Individual 8219s have the capability for converting and redriving data transmission signals on the main ring path or the backup path. These optical fiber repeaters are used in pairs to convert copper wire signals to optical fiber and back.

Typically, these units would be installed in standard 19-inch racks or attached to flat surfaces such as walls or shelves. Rack installations require a Rack Mounting Assembly which accommodates up to seven individual 8219s. The 8219's may be installed in a Rack Mounting Assembly without powering down other 8219s in the same assembly. One power cord plugs into the customer's power outlet per Rack Mounting Assembly. (The Rack Mounting Assembly accommodates a mix of 8219s or 8218 Token-Ring Network Copper Repeaters or both.)

Flat surface installations require the Surface Mounting Brackets. An individual 8219 snaps easily into and out of the bracket. The Optical Fiber Dual Socket Clip is used as a strain relief for the cables when the 8219 is installed to a flat surface.

Each pair of 8219s require one Crossover Patch Cable and two Optical Fiber BNC to Biconic Patch Cables. Crossover Patch Cables, Optical Fiber BNC to Biconic Patch Cables, Optical Fiber Biconic to Biconic Patch Cables, Optical Fiber Connectors, and Optical Fiber Dual Socket Clips are accessories for the 8219. These accessories are not available from IBM.

8219s operate in the IBM Token-Ring Network environment which has Telephone Twisted-Pair media installed. A Data Grade Media to Type 3 Filter is required for each repeater installed in this configuration. (Refer to "IBM Token-Ring Network Telephone Twisted-Pair Media Guide", GA27-3714, NDD 69X7824.

8219s can also operate in the IBM Token-Ring Network environments that have fiber cable other than IBM Cabling System Type 5

cable installed between 8228 Multistation Access Units. The "IBM Token-Ring Network Optical Fiber Cable Option", GA27-3747 publication describes the usage, limitations, and optical fiber accessories required to operate 8219s on fiber sizes such as 62.5/125, 50/125, 85/125 micron.

Customer Responsibilities

The customer is responsible for planning the network configuration, installing a cabling system, setting up the repeaters, connecting the repeaters into a network, performing customer problem analysis and resolution (CPAR) procedures, maintaining accurate configuration charts, and labeling all devices and cables. (Reference "IBM Token-Ring Network Introduction and Planning Guide", GA27-3677.)

Warranty: One year.

Publications: The following publications are available:

- "IBM Token-Ring Network Optical Fiber Cable Options", GA27-3747.* Provides customer information on usage, drive limitations, and required fiber accessories of 8219s operating with fiber cables other than IBM Cabling System Type 5. Information for determining the operation of the 8219 with other fibers is provided.
- "IBM Token-Ring Network Introduction and Planning Guide", GA27-3677.* Information for developing an installation plan for local area networks.
- "IBM Cabling System Planning and Installation Guide", GA27-3361. Information is provided to assist the customer in planning, installing, and testing the cabling system. (Type 3 media information not included.)
- "IBM Token-Ring Network Telephone Twisted-Pair Media Guide", GA27-3714.* Contains component descriptions, limitations, Type 3 media specifications, and planning and installation information for implementing the IBM Token-Ring Network on telephone twisted-pair media.
- "IBM Token-Ring Network Installation Guide", GA27-3678.** Contains instructions for the installation of the local area network using the previously installed data grade media. (Type 3 media information not included.)
- "IBM Token-Ring Network Problem Determination Guide", SX27-3710.** A step-by-step description of the procedures used to isolate and resolve network failures, including operational instructions for use of the ring diagnostic program. (Type 3 media information not included.)
- "IBM Token-Ring Network Administrator's Guide", GA27-3748.** This publication provides information to assist the administrator of the IBM Token-Ring Network for evaluating and improving the performance of a ring during and after installation is discussed.

* Available April 1986.

** Available June 1986.

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

ACCESSORIES

Description	Feature Number	Part Number
-------------	----------------	-------------

MACHINES

M 8219.2
MAY 86
NEW

Rack Mounting Assembly	3001	6339139	Cable - 2.5m (8 ft) --	6165812
Surface Mounting Brackets	3002	6339140	Optical Fiber Biconic to Biconic Patch	
Crossover Patch Cable	--	6339137	Cable - 9.5m (30 ft) --	6165813
Data Grade Media to Type 3 Filter	--	6466943	Optical Fiber Connector	6339106
Optical Fiber BNC to Biconic Patch			Optical Fiber Dual	
Cable - 2.5m (8 ft)	--	6165811	Socket Clip	6165847
Optical Fiber Biconic to Biconic Patch				

SUPPLIES (NONE)

8228 TOKEN-RING NETWORK MULTISTATION ACCESS UNIT AND NETWORK STARTER KITS

PURPOSE

Attaches up to eight devices into the IBM Token-Ring Network.

Network Program, and an Installation Guide. The kits are designed to help the new user quickly setup a small, expandable pilot network.

MODELS

Model 1 001: Token-Ring Network Multistation Access Unit

Model KT1: (NO LONGER AVAILABLE)

Model KT2: Token-Ring Network Starter Kit for IBM Personal Computer (5150, 5160, 5162, 5170) and IBM Personal System/2 (8530).

Model KT3: Token-Ring Network Starter Kit/A for IBM Personal System/2 (8550, 8560, 8580-041, 8580-071).

Token-Ring Network Starter Kit

Customer Setup (CSU): The multistation access unit and starter kit are installed by the customer. Installation instructions are included with each unit. Installation service for the unit is available from IBM at hourly rates and minimums.

Customer Responsibilities: The customer is responsible for planning the network configuration, installing a cabling system, installing the access units, connecting the access units into a network, performing customer problem analysis and resolution (CPAR) procedures, maintaining accurate configuration charts, and labeling all devices and cables.

Warranty Service and Maintenance: Model 001 is warranted for a period of twelve months. Warranty service is obtained by calling the Service/Exchange Communications Center to arrange for customer carry-in exchange to a Service/Exchange Center. Optional warranty service, customer on-site exchange, is available for an additional charge. Warranty Service and Maintenance provisions of the individual components contained in models KT2 and KT3 will apply.

Publications: Installation instructions are included with each unit. Other related publications include:

- "IBM Token-Ring Network Introduction and Planning Guide" (GA27-3677)
- "IBM Token-Ring Network Installation Guide" (GA27-3678)
- "IBM Token-Ring Network Problem Determination Guide" (SY27-0280)

HIGHLIGHTS

- The access unit provides for the attachment of up to eight devices to the network. Cables from the attaching devices are simply plugged into the unit. An access unit can be interconnected to other access units to form larger networks. The unit can automatically bypass an attached device by reacting to the presence or absence of a signal from the device.
- The access unit is designed for installation in a standard 19-inch rack (not available from IBM) or in a component housing. The component housing is available as an optional accessory, and is required for installation of the access unit on a wall or table top. A cable bracket is included with the access unit, and is used to organize and identify the cables attached to a rack mounted access unit.
- The starter kits provide the necessary hardware (excluding workstations) and software to establish a four workstation token-ring network. The kits include an access unit (model 001), housing, four adapters, four adapter cables, four 9.1m (30 ft.) cable assemblies, four copies each of the IBM Local Area Network Support Program and the IBM PC Local Area

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

IBM Cabling System Component Housing (#1078, P/N 6091078): The component housing is used for installation of the multistation access unit on a wall or table top.

SUPPLIES (NONE)

8503 PERSONAL SYSTEM/2 MONOCHROME DISPLAY

PURPOSE

The IBM Personal System/2 Monochrome Display 8503 is a multi-mode, paper white-phosphor, monochrome display featuring advanced text, graphics, and imaging capabilities. Integrated tilt/swivel base is standard. Up to 64 shades of gray can be shown when attached to the Integrated Display Adapter in a Personal System/2 system unit, to the IBM Personal System/2 Display Adapter or to the Personal System/2 Display Adapter 8514/A. It can provide 640 x 480 graphics and 720 x 400 text in addition to compatibility modes.

MODELS

Model 001: 110V

Limitations: The above displays require analog input and are therefore not compatible with previous IBM Personal Computers, unless a Personal System/2 Display Adapter is installed in the system unit.

Customer Setup (CSU): The 8503 is designated as customer setup. Setup instructions are included with the display. CSU allowance is one day.

HIGHLIGHTS

- Lowest priced IBM display offering for Personal System/2 systems.
- Expanded gray-shade capability supports up to 64 gray-shades when using the Personal System/2 Integrated Display Adapters and Personal System/2 Display Adapter graphics modes.
- Supports adapter capability to convert color graphics to gray-shades, including modes compatible with Color/Graphics Monitor Adapter and Enhanced Graphics Adapter.
- Modes selectable under program control.
- 70 frame/second operation in all compatibility and text modes.
- Supports 8-pixel wide border in 640 x 480 graphics mode.
- Supports up to 9-pixel wide character box and 1-character wide border in text mode.
- White phosphor for black-on-white or white-on-black screen.

Standard Features:

- External contrast adjustment
- External brightness control
- Customer diagnostic self-test
- Tilt/swivel base

DESCRIPTION

Analog-drive monochrome display:

- 320, 640 and 720-dot lines
- 350, 400, and 480-line operation
- 200-line modes run scan-doubled (400 lines) for improved solidity of lines, characters and shapes
- Up to 64 gray-shades can be displayed
- 6-ft signal cable

- Paper-white phosphors
- Etched screen for low glare
- 50-70 Hz vertical refresh rate
- 31.5K Hz horizontal scan frequency
- 12-inch screen
- Driven by Integrated Display Adapters in Personal System/2 Models 30/50/60/80 system units or by Personal System/2 Display Adapter 8514/A or by a Personal System/2 Display Adapter

Physical Specifications:

Width - 321mm (12.6 inches)
 Depth - 311mm (12.2 inches)
 Height - 312mm (12.3 inches) - with stand
 Height - 277mm (10.9 inches) - without stand
 Weight - 8.5kg (18.8 pounds)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60 to 90 degrees F)
 Relative Humidity: 8 to 80 percent
 Maximum Wet Bulb: 27.0 degrees C (80.6 degrees F)
 Altitude: 0 to 2134m (7,000 ft)

Publications: The following publications are shipped with the display and are not available separately.

- IBM Personal System/2 Display Installation and Testing Instructions - P/N 6280055

The following publication is available for sale, and can be obtained by contacting an Authorized IBM Personal Computer Dealer, or an IBM Sales Representative. It may also be obtained through the Technical Directory, a copy of which is included with the initial system documentation. Please see the directory for details.

- Technical Reference Supplement
 - 8503/8512/8513 Display - P/N 68X2206, S68X-2206

The publications listed below will be available in the following languages: Danish, Dutch, English UK, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish and Swedish.

- IBM Personal System/2 Display Installation and Testing Instructions - P/N 6280055
- Hardware Maintenance Service
- Hardware Maintenance Reference

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

8512 PERSONAL SYSTEM/2 COLOR DISPLAY

PURPOSE

The 8512 Color Display is a low-cost analog color display for the IBM Personal System/2 systems. It takes full advantage of the new color graphics capabilities offered in the IBM Personal System/2 by providing addressability up to 640 by 480 in graphics mode. It can also be used with the current line of IBM Personal Computer processors, if a Personal System/2 Display Adapter is installed in the system.

MODELS

Model 001: 110V

Limitations: The 8512 requires analog input and is not compatible with previous IBM Personal Computers, unless a Personal System/2 Display Adapter is installed in the system. In addition to supporting the Personal System/2 family of processors, it may also be attached to the Personal System/2 Display Adapter 8514/A.

Customer Setup (CSU): The 8512 is designated as customer setup. Setup instructions are included with the display. CSU allowance is one day.

HIGHLIGHTS

- 14 inch color display
- Analog RGB video input drive
- Up to 70 Hz vertical refresh rate
- Customer Diagnostic Self-Test Pattern
- Self-contained AC power supply

DESCRIPTION

The 8512 Color Display has been designed as a balance between the need for addressability and the ability to blend colors for near image-quality application output. All models are functionally equivalent and have the following features:

- 14 inch, 0.41 stripe, color display
- 31.5K Hz horizontal scan frequency
- Direct light etch
- Non-interlaced
- 320, 640, and 720 dot lines of horizontal addressability
- 350, 400, and 480 lines of vertical addressability
- 200 line modes run double scanned (400 lines)
- Up to 70 Hz vertical refresh rate, all modes except 640 x 480 which is 60 Hz
- Analog RGB video input drive
- Self-contained power supply
- Signal cable with 15-pin subminiature D-shell connector
- Optional Tilt/swivel stand

Standard Features: The 8512 Color Display has the following standard features:

- External contrast adjustment
- External brightness control
- Automatic power-on self-test

Physical Specifications:

Width: 355mm (14.0 in.)
Depth: 394mm (15.5 in.)
Height: 370mm (14.6 in.) - with stand
Height: 304mm (12.0 in.) - without stand
Weight: 15kg (33.0 lbs.)

Operating Environment:

Temperature - 15.0 to 33.0 degrees C (60 to 90 degrees F)
Relative Humidity - 8 to 80 percent
Maximum Wet Bulb - 27.0 degrees C (80.6 degrees F)

Publications: The following publications are shipped with the display, or accessory as appropriate, and are not available separately.

- (P/N 6280055) Monitor Installation (US)
- (P/N 6280151) IBM 8512 Color Display Stand

The following publication is available for sale, and can be obtained by contacting an Authorized IBM Personal Computer Dealer, or an IBM Sales Representative. It may also be obtained through the Technical Directory, a copy of which is included with the initial system documentation. Please see the Directory for details.

- (P/N 68X2206, S68X-2206) Personal System/2 Display Technical Reference Supplement

SPECIFY (NONE)

SPECIAL FEATURES

Personal System/2 Color Display Stand (#5004) (#1501215): This option is announced to enhance the customer's flexibility in installing the 8512 Color Display, from an ergonomic viewpoint. This option snaps onto the bottom of the 8512 Color Display and allows the user to adjust the display both horizontally and vertically for maximum comfort. It is easily removable should requirements change.

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

8513 PERSONAL SYSTEM/2 COLOR DISPLAY

PURPOSE

The 8513 System/2 Color Display is a multi-mode analog color display featuring advanced text, graphics and imaging capabilities. Integrated Tilt/Swivel base is standard. Up to 256 colors at a time can be selected from 262,144 possible colors when attached to the Integrated Display Adapter in a IBM Personal System/2 system unit, to the IBM Personal System/2 Display Adapter, or to the IBM System/2 Display Adapter 8514/A. It can provide 640 x 480 graphics and 720 x 400 text in addition to compatibility modes.

MODELS

Model 001: 110V

Limitations: The 8513 requires analog input and is not compatible with previous IBM Personal Computers, unless a Personal System/2 Display Adapter is installed in the system unit.

Customer Setup (CSU): The 8513 is designated as customer setup. Setup instructions are included with the display. CSU allowance is one day.

HIGHLIGHTS

- Expanded color capability, with up to 256 discrete colors at one time selected from 262,144 colors when attached to Integrated Display Adapters in Personal System/2 system units or to Personal System/2 Display Adapter or System/2 Display Adapter 8514/A.
- Supports 640 x 480, 16-color mode provided by Personal System/2 Models 50, 60, 80 Integrated Display Adapter and by the Personal System/2 Display Adapter.
- Supports 320 x 200, 256 color mode provided by all Personal System/2 Integrated Display Adapters and by the Personal System/2 Display Adapter.
- Modes selectable under program control.
- 70 frame-second operation in all compatibility and text modes.
- Supports 8-pixel wide border in 640 x 480 graphics mode.
- Supports up to 9-pixel wide character box and 1-character wide border in text mode.
- Tilt-swivel base.

Standard Features: The 8513 Color Display has the following standard features:

- External contrast adjustment
- External brightness control
- Customer diagnostic self-test pattern

Physical Specifications:

Width - 321mm (12.6 in.)
Depth - 362mm (14.5 in.)
Height - 312mm (12.3 in.) - with stand
Height - 277mm (10.9 in.) - without stand
Weight - 10.5kg (23.0 lbs.)

Operating Environment:

Temperature: 15.6 degrees to 32.2 degrees C (60 degrees to 90 degrees F)
Relative Humidity: 8 to 80 percent
Maximum Wet Bulb: 27.0 degrees C (80.6 degrees F)
Altitude: 0 to 2,134m (7,000 ft)

Publications: The following publication is shipped with the display and is not available separately.

- P/N 6280055 IBM Personal System/2 Display Installation and Testing Instructions

The following publication is available for sale, and can be obtained by contacting an Authorized IBM Personal Computer Dealer, or an IBM Sales Representative. It may also be obtained through the Technical Directory, a copy of which is included with the initial system documentation. See the Directory for details.

- 8503/8512/8513 Display (P/N 68X2206) (S68X-2206)

IBM Personal System/2 Display Installation and Testing Instructions (P/N 6280206) is available in the following languages: Danish; Dutch; English (UK); Finnish; French; German; Italian; Norwegian; Portuguese; Spanish and Swedish

DESCRIPTION

Analog-drive color display.

- 320, 640 and 720-dot lines
- 350, 400, and 480-line operation
- 200-line modes run scan-doubled (400 lines) for improved solidity of lines, characters and shapes
- 6 ft. signal cable
- 12 inch screen
- 50-70 Hz vertical refresh rate
- 31.5K Hz horizontal scan frequency
- 0.28mm phosphor dot pitch
- Black, etched screen for low glare
- Driven by Integrated Display Adapters in Personal System/2 Models 30, 50, 60, 80 system units or by Personal System/2 Display Adapter or System/2 Display Adapter 8514/A.

SPECIFY (NONE)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)

8514 PERSONAL SYSTEM/2 COLOR DISPLAY

PURPOSE

The 8514 Personal System/2 Color Display 8514 provides a high-quality, high-content display for the Personal System/2 Models 30, 50, 60 and 80. The 8514 Personal System/2 Color Display operates in a variety of modes giving support for the adapters included in Personal System/2 Models 30, 50, 60 and 80, the Personal System/2 Display Adapter and the new high content format available with Personal System/2 Display Adapter 8514/A.

MODELS

Model 001

Limitations: The 8514 Personal System/2 Color Display requires analog video input signals and can only be used with the IBM Personal Computer, Personal Computer XT, Personal Computer XT 286 and Personal Computer AT when a Personal System/2 Display Adapter (#4050) is installed in the system.

The 8514 Personal System/2 Color Display cannot be attached to the IBM Color/Graphics Monitor Adapter, the Enhanced Graphics Adapter, the Professional Graphics Controller or the Monochrome Display Printer Adapter.

Customer Setup (CSU): The 8514 Personal System/2 Color Display is designated as customer setup. Setup instructions are included with the display. CSU allowance is one day.

HIGHLIGHTS

- 16 inch Color Display
- 1,024 x 768 Display mode
- Multi-mode capability for displaying MPA, CGA, EGA and VGA modes
- Analog RGB video input drive.
- Independent AC power supply.

Standard Features: The 8514 Personal System/2 Color Display has the following standard features:

- External contrast adjustment
- External brightness control
- Customer Diagnostic Test Pattern
- Tilt and Swivel

Physical Specifications:

Width - 400mm (15.7 in.)
Length - 415mm (16.3 in.)
Height - 320mm (12.6 in.) - 360mm (14.2 in.) with Tilt/Swivel
Weight - 19.0kg (41.9 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60 to 90 degrees F)
Relative Humidity: 8 to 80 (percent)
Wet Bulb: 27.0 degrees C (80.6 degrees F)

Publications: The following publication is shipped with the display.

- (P/N 75X5904) Installation Instructions

The following publications are available for sale, and can be obtained by contacting an Authorized IBM Personal Computer Dealer, or an IBM Sales Representative.

- (P/N 68X2214) Technical Reference
- (P/N 68X2218) Hardware Maintenance-Library Supplement

The "Installation Instruction" publication will be available in the following languages: Dutch; English (UK); French; German; Italian; Norwegian; Portuguese and Spanish.

DESCRIPTION

The 8514 Personal System/2 Color Display is a high quality, high content 16 inch color display for the IBM Personal Computer family. The 8514 Personal System/2 Color Display is a multi-mode display which is capable of displaying up to 1,024 pels horizontally by 768 pels vertically. The 8514 Personal System/2 Color Display has a viewable area of 283mm horizontally by 212mm vertically. Medium persistence phosphors are used with refresh rates of 43.5 Hz interlaced and 60 Hz and 70 Hz non-interlaced giving a bright flicker free display image. A tilt and swivel mechanism may be attached to the base of the display unit and is provided as standard. The range of swivel is plus/minus 90 degrees. The range of tilt is from 5 degrees down to 20 degrees up.

Screen Content: Pels per row: Up to 1,024 (determined by the display adapter) Lines per Screen. There are four modes.

- 768 2:1 interlaced 43.5 Hz (87 fields/sec)
- 480 non-interlaced 60 Hz
- 400 non-interlaced 70 Hz
- 350 non-interlaced 70 Hz

Analog RGB video input drive Independent AC power supply. Signal cable with 15-pin subminiature "D"-shell connector.

SPECIFY

- Power: Model 001 - 100-125V AC, 50/60 Hz
- Signal cable: 1.8m (6 ft.)
- Power cord: 1.8m (6 ft.)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

8525 PERSONAL SYSTEM/2 MODEL 25

THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT

PURPOSE

The 8525 Personal System/2 Model 25 is a low-priced, general-purpose computer system that accepts most current adapters and offers approximately two times the processor performance of current 8088-based IBM Personal Computers. The Model 25 uses the Intel 8086 processor and operates at 8M Hz with no wait states to system memory.

This system utilizes a single element system unit and display design that allows for maximum utilization of desk space and provides high-quality graphics consistent with the IBM Personal System/2 family of analog displays.

The 8525 Models 001 and 004 include the IBM Space Saving Keyboard designed for high productivity and with the same touch quality as other Personal System/2 keyboards. The 8525 Models G01 and G04 include the IBM Personal System/2 Enhanced Keyboard with numeric keypad.

The 8525 is available in both monochrome (8525-001 and 8525-G01) and color (8525-004 and 8525-G04) versions. All models come with one 3.5-inch (720Kb) diskette drive, 512Kb of Random Access Memory (RAM), keyboard and a 12-inch analog display. Two features are announced to upgrade the function of all models. A second 3.5-inch (720Kb) diskette drive and an additional 128Kb RAM of memory are available.

MODELS 001, G01, 004, G04

Model 001 (Canada only) (P/N 8525001, 8525F01) < (APG,LAD only) (P/N 8525N01, 8525S01) <: Integrated central processing unit and 12-inch monochrome analog display, 512Kb RAM, one 3.5-inch 720Kb diskette drive, IBM Space Saving Keyboard. (Canada only) > (P/N 8525001 - US English, P/N 8525F01 - Canadian French) < (APG,LAD only) > (P/N 8525N01 - Northern Hemisphere, P/N 8525S01 - Southern Hemisphere) <

Model G01: Single element central processing unit with 12-inch monochrome analog display, 512Kb RAM, one 3.5-inch 720Kb diskette drive, IBM Enhanced Keyboard.

Model 004 (Canada only) (P/N 8525004, 8525F04) < (APG,LAD only) (P/N 8525N04, 8525S04) <: Single element central processing unit with 12-inch color analog display, 512Kb RAM, one 3.5-inch 720Kb diskette drive, IBM Space Saving Keyboard. (Canada only) > (P/N 8525004 - US English, P/N 8525F04 - Canadian French) < (APG,LAD only) > (P/N 8525N04 - Northern Hemisphere, P/N 8525S04 - Southern Hemisphere) <

Model G04: Single element central processing unit with 12-inch color analog display, 512Kb RAM, one 3.5-inch 720Kb diskette drive, IBM Enhanced Keyboard.

Prerequisites: IBM Personal Computer DOS users require DOS 3.3.

Customer Setup (CSU): The 8525 is designated as customer setup. Setup instructions are included with the system and features.

HIGHLIGHTS

- Enhanced price/performance ratio.
- Approximately 2 times the processor speed of the 8088-based Personal Computer.

- Graphics adapter displays up to 256 colors out of 262,144 colors or displays 64 shades of gray (Multi-Color Graphics Array).
- Graphics adapter, diskette drive adapter, serial, and parallel ports included.
- New design, smaller size with reduced power requirements.
- 12-inch color or monochrome graphics analog displays.
- Advanced technology eliminates customer setup switches.
- One-year warranty.
- National Language Enabling for 16 languages.

Standard Features: All models have the following features:

- 512Kb random access memory (RAM) expandable to 640Kb on the system board
- Integrated diskette adapter supporting up to two 3.5-inch 720Kb drives
- 12-inch analog display (color or monochrome)
- Multi-Color Graphics Array (MCGA) with 64Kb display buffer
- Serial port
- Parallel port
- Pointing device port
- Keyboard port
- IBM Space Saving Keyboard or IBM Enhanced Keyboard
- Audio earphone connector
- Socket for a math co-processor (8M Hz)
- One full-size and one 8-inch general-purpose slot to accommodate IBM 5150 Personal Computer, Personal Computer XT(TM), and some non-IBM personal computer option cards which do not exceed 0.8-inches thickness

Multi-Color Graphics Array, the graphics adapter function that has been integrated into the planar, supports all existing Color Graphics Adapter (CGA) modes. In addition to providing existing CGA support, four new expanded modes are included in MCGA (640 by 350 line mode not supported):

- 640 by 480 by 2 colors out of 262,144 colors - all points addressable
- 320 by 200 by 256 colors out of 262,144 colors - all points addressable
- 40 by 25 by 16 colors out of 262,144 colors - text (8 X 16 character box)
- 80 by 25 by 16 colors out of 262,144 colors - text (8 X 16 character box)

The integrated Multi-Color Graphics Array will automatically use up to 64 shades of gray in converting color modes of operations for display on the 8525-001 and 8525-G01 (monochrome model). This allows users who prefer a monochrome display to execute color graphics applications.

Physical Specifications: Processor/Display

Width: (side-to-side) 320mm (12.6 in.)
Width: (footprint) 240mm (9.5 in.)
Depth: (front-to-back) 375mm (14.7 in.)
Height: (top-to-bottom) 382mm (15 in.)
Weight: 12.7kg (28 lbs) 8525-001, 8525-G01
Weight: 16.8kg (37 lbs) 8525-004, 8525-G04

Space Saving Keyboard: Dimensions - 407mm by 190mm (16 in. by 7.5 in.) Weight - 1.9kg (4.2 lbs)

Enhanced Keyboard: Dimensions - 493mm by 210mm (19.4 in. by 8.3 in.) Weight - 2.3kg (5 lbs)

Operating Environment:

Temperature: 15.6 to 32.2C (60 to 90F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8C (73F)

PUBLICATIONS

The following publication is shipped with the product:

- S75X-1051 Guide to Operations (P/N 75X1051)

The following publications are available for sale and can be obtained by contacting an IBM Authorized Personal Computer Dealer or an IBM Sales Representative. They may also be obtained through the Technical Directory, a copy of which is included with the "Guide to Operations". Please see the Directory for details.

- S75X-1051 Guide to Operations (P/N 75X1051)
- SA23-1201 Hardware Maintenance Service Supplement (P/N 75X1054)
- SA23-1202 Technical Reference Manual (P/N 75X1055)
- SA23-1200 Hardware Maintenance Reference Supplement (P/N 75X1059)
- S68X-2225 3.5-Inch 720Kb/1.44Mb Diskette Drive Technical Reference Manual (P/N 68X2225)
- S01F-0200 Hardware Maintenance Binder (P/N 01F0200)

National Language Support (NLS): The "Guide to Operations" is available in Canadian French, Spanish, and US English.

- S01F-0202 Guide to Operations (Canadian-French) (P/N 01F0202)
- S01F-0214 Guide to Operations (Spanish) (P/N 01F0214)

DESCRIPTION

The IBM Personal System/2 Model 25 uses advanced technology to provide existing Personal Computer functions at an attractive price. Two card slots provide increased compatibility by allowing the attachment of many existing Personal Computer feature cards. A 12-inch analog display (color or monochrome), display adapter, RS-232-C serial adapter, parallel adapter, and diskette adapter are standard, increasing base function while reducing price. This general-purpose system is based on an 8086 microprocessor, running at 8M Hz, with no wait states to system memory, which results in an internal processing speed approximately twice that of 8088-based Personal Computers.

All models of the 8525 have a 512-character RAM loadable video character generator. This allows any single-byte character set code page to be loaded and utilized when in text mode. DOS 3.3 provides code page and keyboard support for the following languages:

- US English
- Canadian French
- South American Spanish

Customer publications are translated and available in the National Languages.

SPECIFY (NONE)

SPECIAL FEATURES

3.5-Inch 720Kb Diskette Drive (#4104, P/N 78X8956): This feature allows the user to install a second 3.5-inch 720Kb diskette drive in Personal System/2 Model 25 (8525-001, G01, 004, and G04).

System Board 128Kb Memory Expansion Kit (#4105, P/N 78X8955): This feature allows the user to install an additional 128Kb of RAM on the system board which increases memory from 512Kb to 640Kb.

(Except LAD > PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT, and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full-length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD > The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD > Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width: 20.32mm (0.8 in.)
Depth: 336mm (13.26 in.)
Height: 107.95mm (4.25 in.)
Weight: 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2C (60 to 90F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8C (73.4F)

Publications:

- P/N 75X1049 Hardware Maintenance Service Supplement
- P/N 75X1048 Technical Reference Supplement <)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Carrying Case (#4103, P/N 78X8954): This accessory has been designed to simplify the relocation of the 8525. It has provision for diskettes, manuals, line cords, and keyboard in addition to the Systems Unit.

The physical characteristics are:

- Dimensions: 360mm wide x 400mm high x 410mm deep (14.4 x 16 x 16.4 inches)
- Weight: 3.8 lbs.
- Color: Gray
- Fabric: 420 denier nylon oxford, normal density, acrylic coated

SUPPLIES

3.5-Inch, 1.0Mb Diskette (P/N 6404107): 10-pack. Note: The 2.0Mb Diskette (P/N 6404078) is not supported.

8525 PERSONAL SYSTEM/2 MODEL 25 COLLEGIATE AND IBM PERSONAL SYSTEM/2 COLLEGIATE KIT

PURPOSE

The 8525 Personal System/2 Model 25 Collegiate, which includes the IBM Personal System/2 Collegiate Kit, enhances the IBM Personal System/2 family by providing a total application solution for students, faculty, and staff of higher educational institutions. The Collegiate provides a graphics-based user interface for ease-of-use, and built-in capabilities to generate documents containing multi-font text and graphics.

The IBM Collegiate is available in both monochrome and color versions. All models come with two 3.5-inch (720Kb) diskette drives, 640Kb of Random Access Memory (RAM), a 12-inch analog display and the IBM Collegiate Kit. Two keyboards are also available, the IBM Personal System/2 Enhanced Keyboard and the IBM Space Saving Keyboard.

The IBM Collegiate Kit contains an IBM Personal System/2 Mouse, IBM DOS 3.3, full Microsoft* Windows 1.04, four blank 3.5-inch diskettes, and preconfigured system diskettes.

* Microsoft is a registered trademark of Microsoft Corporation.

The IBM Personal System/2 Collegiate Kit also supports the IBM Personal System/2 Model 30 (8530-002). Both the Collegiate and the Collegiate Kit are available to non-education customers as well as education customers.

MODELS C02, C05, K02, K05

Model C02: Collegiate package including IBM Personal System/2 Model 25-001, a single element system unit with monochrome analog display, 640Kb Random Access Memory (RAM), a second 3.5-inch (720Kb) diskette drive, IBM Space Saving Keyboard and an IBM Personal System/2 Mouse, Software, System Diskettes, and Tutorial.

Model C05: Collegiate package including IBM Personal System/2 Model 25-004, a single element system unit with color analog display, 640Kb Random Access Memory (RAM), a second 3.5-inch (720Kb) diskette drive, IBM Space Saving Keyboard, and an IBM Personal System/2 Mouse, Software, System Diskettes, and Tutorial.

Model K02: Collegiate package including IBM Personal System/2 Model 25-G01, a single element system unit with monochrome analog display, 640Kb Random Access Memory (RAM), a second 3.5-inch (720Kb) diskette drive, IBM Enhanced Keyboard and an IBM Personal System/2 Mouse, Software, System Diskettes, and Tutorial.

Model K05: Collegiate package including IBM Personal System/2 Model 25-G04, a single element system unit with color analog display, 640Kb Random Access Memory (RAM), a second 3.5-inch (720Kb) diskette drive and an IBM Personal System/2 Mouse, Software, System Diskettes, and Tutorial.

Limitations: The system units included in the IBM Personal System/2 Model 25 Collegiate Models 8525-C02/K02 and 8525-C05/K05, are a standard IBM Personal System/2 Model 25 and as such, all limitations listed for those machine types apply to their respective "Collegiate" configuration.

HIGHLIGHTS

- Provides a total application solution for students.
- Designed for ease of use.
- New design, smaller size with reduced power requirements.

- Single element system unit and display design with 12-inch monochrome or color graphics analog display.
- Graphics adapter, diskette drive adapter, serial and parallel ports included.
- Preconfigured system diskette with tutorial which aids in system support.
- IBM Personal System/2 Collegiate Kit can be sold separately.

DESCRIPTION

The IBM Personal System/2 Model 25 Collegiate enhances the IBM Personal System/2 family by providing a total application solution for students. It provides a graphics-based user interface, word processor and graphic paint application. A standard configuration is ordered by a single part number that delivers a complete Collegiate student package.

With the exception of the system diskettes and tutorial, the individual part numbers are also available for separate order.

The IBM Personal System/2 Model 25 Collegiate is comprised of:

- One of the following system units:
 - IBM Personal System/2 Model 25 (IBM 8525-001/G01) System unit (monochrome display)
 - IBM Personal System/2 Model 25 (IBM 8525-004/G04) System unit (color display)

Each system comes standard with:

- 640Kb random access memory (RAM) on the system board.
- Two 3.5-inch 720Kb drives.
- 12-inch analog display (color or monochrome).
- Multi-Color Graphics Array (MCGA) with 64Kb display buffer.
- Serial port.
- Parallel port.
- Pointing device port.
- Keyboard port.
- IBM Space Saving Keyboard or IBM Personal System/2 Enhanced Keyboard.
- Audio earphone connector.
- Socket for a math co-processor.
- One full-size and one 8-inch general-purpose slot to accommodate IBM 5150 Personal Computer, Personal Computer XT(TM) and some non-IBM personal computer option cards which do not exceed 0.8 inches thickness.

Multi-Color Graphics Array, the graphics adapter function that has been integrated into the planar, supports all existing Color Graphics Adapter (CGA) modes. In addition to providing existing CGA mode support, four new expanded modes are included in MCGA (640 X 350 line mode not supported).

- 640 by 480 by 2 colors out of 262,144 colors - all points addressable
- 320 by 200 by 256 colors out of 262,144 colors - all points addressable
- 40 by 25 by 16 colors out of 262,144 colors - text (8 X 16 character box)
- 80 by 25 by 16 colors out of 262,144 colors - text (8 X 16 character box)

The integrated Multi-Color Graphics Array will automatically use up to 64 shades of gray in converting color modes of operations for display on the 8525-C02 or 8525-K02 (monochrome models). This allows those who prefer a monochrome display to execute color graphics applications.

IBM Personal System/2 Collegiate Kit: The IBM Personal System/2 Collegiate Kit (P/N 6024772), available separately or included with the IBM Personal System/2 Collegiate is comprised of:

- IBM Personal System/2 Mouse.
- As a convenience to the end-user, IBM has configured portions of the DOS 3.3 and Microsoft Windows 1.04 programs onto diskettes. Additionally, other copyrighted programming materials are provided on diskettes for ease of use and performance optimization.
- Four blank 3.5-inch diskettes.
- IBM DOS 3.3.
- Full Microsoft Windows 1.04, an interactive system environment manager that includes:
 - Windows Write
 - Windows Paint
 - Windows Cardfile
 - Windows Desktop Accessories
 - Device drivers for Multi-Color Graphics Array (MCGA), IBM Personal System/2 Mouse and keyboard
 - Installation Guide

Microsoft Windows, including its device support extensions, Write, Paint, Cardfile and other desktop aids constitutes a student word processing and productivity package that allows:

- Text-and-graphics composite documents to be created.
- Composite multi-font documents to be printed on a variety of printers (see Note).
- Personal Desktop programs to be used for calendar, entry data base and calculations.

Note: The IBM Personal System/2 Model 25 Collegiate is preconfigured and tested for the display adapters of the IBM Personal System/2 Model 25 and for the IBM Proprinter (4201-001/002), Proprinter XL (4202), Proprinter X24 (4207), and Proprinter XL24 (4208). Although IBM has not tested other configurations, Microsoft Windows supports many other printers.

If the user wants to run outside of the Windows environment, additional applications can be added using DOS 3.3. (Refer to M8525 pages above for a list of software compatibility.)

(APG,Canada only> The following minimum configuration is required to support the IBM Personal System/2 Collegiate Kit:

- Any model of the IBM Personal System/2 Model 25 (8525-001, 8525-G01, 8525-004 or 8525-G04) or the IBM Personal System/2 Model 30-002 (8530-002).
- 640Kb Random Access Memory (RAM) (Model 25).
- Two 3.5-inch 720Kb Diskette Drives (Model 25).

Except as noted in "Compatibility", the correct operation of other IBM or vendor application programs in the Collegiate Kit Windows environment have not been tested and are therefore not supported.<)

Document Creation: The IBM Personal System/2 Model 25 Collegiate provides a complete set of functions for the creation and editing of text and graphics and their formatting in a document.

The IBM Personal System/2 Model 25 Collegiate provides two areas of integration:

1. Text integration: The ability to combine into a single composite document, personal computer-based text and graphics. This extends to the support of most popular printers from inexpensive matrix printers to advanced page printers (see Note).
2. Application integration: The ability of the user to move between the various stages of document preparation smoothly, with a consistent, easily understood interface being presented.

Note: The IBM Personal System/2 Model 25 Collegiate is preconfigured and tested for the display adapters of the IBM Personal System/2 Model 25 and for the IBM Proprinter (4201-001/002), Proprinter XL (4202), Proprinter X24 (4207), and Proprinter XL24 (4208). Although IBM has not tested other configurations, Microsoft Windows supports many other printers.

Usability and Performance: For the IBM Personal System/2 Model 25 Collegiate, considerable emphasis has been placed on the different aspects of usability:

- Ease of Setup: The user is able to start operating the system without a long and complex setup process.
- Ease of learning: The user is able to gain productive use from the system quickly, without having to be familiar with every function and feature. A tutorial is provided to introduce the end-user to the Microsoft Windows environment and applications.
- Ease of use: The IBM Personal System/2 Model 25 Collegiate is designed for ease of use. The following state-of-the-art techniques are employed:
 - Use of a pointing device - IBM Personal System/2 Mouse.
 - Use of icons and pull-down menus to simplify user choices.
 - Consistent interface presented by the key applications.
 - Multiple concurrent applications. This capability allows users to create different document elements as required and in context.

For the IBM Personal System/2 Model 25 Collegiate considerable emphasis has been placed on the different aspects of performance:

- The IBM Personal System/2 Model 25 Collegiate provides an interactive composition environment in which document pages are presented on the screen as closely as possible to their printed appearance (What You See Is What You Get). User layout choices are immediately reflected in changes to the screen.
- System Units: The IBM Personal System/2 Model 25 Collegiate system units have sufficient processing speed to support the highly interactive word processing and graphics application and allow for the attachment of the other devices. The system units include sufficient main memory to accommodate the key word processing applications, and DASD for storing:
 - Programs
 - User text and graphics files
 - Fonts
- Input devices: In addition to a keyboard suitable for text entry and editing and other personal productivity applications, an IBM Personal System/2 Mouse is provided, and required for some graphic applications.

SPECIFIED OPERATING ENVIRONMENT

Hardware/Programming Requirements

The IBM Personal System/2 Model 25 Collegiate is shipped as a complete unit, when ordered as a complete system, with all hardware and software included. The end-user must purchase separately and install a printer to print documents directly on their system.

COMPATIBILITY

Software Compatibility: The combination of Windows, including its device support extensions, Write and Paint constitutes a complete higher education student document creation and personal productivity application package.

If the user wants to run outside of the Windows environment, additional applications can be added using DOS 3.3. (Refer to M8525 pages above for Software Compatibility.)

Hardware Compatibility: See M8525 pages above for specific information concerning hardware compatibility of the IBM Personal System/2 Model 25.

Physical Specifications: Refer to M8525 pages above for System Unit details regarding:

IBM Personal System/2 Model 25-001/G01, or
IBM Personal System/2 Model 25-004/G04

Customer Responsibilities:

1. The IBM Personal System/2 Model 25 Collegiate is designated as customer setup.
2. The end-user is responsible for adequate system site planning and preparation, receipt, unpacking, and placement of the Collegiate system and optional I/O, and relocation of the system unit, if required, to allow IBM service access.
3. The end-user is also responsible for physical setup, installing and maintaining cables, connection of cables to communication lines and modems and IBM devices incorporating protected access areas, and checkout in accordance with instructions supplied by IBM. Upon end-user request, IBM will perform the customer setup actions. This service is available at the applicable IBM hourly rates and minimum charges.

INSTALLABILITY

Instructions will be included in the Collegiate system which will guide the end-user through setup of the hardware and show how to start the system software with the system diskettes included in the package.

To set up the IBM Personal System/2 Model 25 Collegiate, the end-user is required to plug in the keyboard, IBM Personal System/2 Mouse, and power cable.

The system diskettes delivered with the product will allow the user to begin word processing after loading the diskettes in the system. A tutorial for Windows will be included to introduce the user to the windowing environment and word processing software.

SECURITY, AUDITABILITY, AND CONTROL

The end-user is responsible for evaluation, selection, and implementation of security features, administrative procedures, and ap-

propriate controls in application systems and communications facilities.

SPECIFY (NONE)

PUBLICATIONS

The following publications are shipped with the product:

- S75X-1051 Guide to Operations (P/N 75X1051)
- Collegiate Kit Installation Guide for the IBM Personal System/2 Model 25 Collegiate (cannot be ordered separately)

The following publications are available for sale and can be obtained by contacting an IBM Authorized Personal Computer Dealer or an IBM Sales Representative. They may also be obtained through the Technical Directory, a copy of which is included with the "Guide to Operations". Please see the Directory for details.

- S75X-1051 Guide to Operations (P/N 75X1051)
- SA23-1201 Hardware Maintenance Service Supplement (P/N 75X1054)
- SA23-1202 Technical Reference Manual (P/N 75X1055)
- SA23-1200 Hardware Maintenance Reference Supplement (P/N 75X1059)
- S68X-2225 3.5-Inch 720Kb/1.44Mb Diskette Drive Technical Reference Manual (P/N 68X2225)
- S01F-0200 Hardware Maintenance Binder (P/N 01F0200)

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Carrying Case (#4103, P/N 78X8954).

SUPPLIES (NONE)

8530 PERSONAL SYSTEM/2 MODEL 30

PURPOSE

The 8530 Personal System/2 Model 30, is a general-purpose computer system which provides enhanced function beyond that established by the IBM PC and PC XT, especially in display graphics, at lower prices to the customer. This system includes as standard, many newly integrated features such as a graphics adapter and parallel port. It also allows for the attachment of many existing PC option cards for further expansion.

The Personal System/2 Model 30 is available in two versions, 8530-002 with two 3.5 inch (720KB) diskette drives, and 8530-021 with a 20Mb fixed disk and a single 3.5 inch diskette drive. All models have 640Kb RAM, standard.

MODELS

Model 002: Central processing unit (including keyboard), with two 3.5 inch 720Kb diskette drives.

Model 021: Central processing unit (including keyboard), with one 20Mb fixed disk with integrated controller, and a single 3.5 inch 720Kb diskette drive.

Limitations: Personal System/2 does not support digital display devices, therefore use of an analog display such as the 8503, 8512, 8513, 8514 or equivalent is required.

Maximum: System growth may be accomplished through options such as those shown in following sections.

Prerequisites: A minimum configuration consists of either model of the 8530, with a display. IBM Personal Computer DOS users require DOS 3.30.

Customer Setup (CSU): The 8530 is designated as customer setup. Setup instructions are included with the system and features. CSU allowance is one day.

HIGHLIGHTS

- High level of integrated function including graphics and parallel port.
- New graphics, standard, display up to 256 colors or 64 shades of gray.
- Approximately two times processor performance of 8088 based PC XT.
- New design, smaller size with reduced power requirements.
- One year warranty.
- Evolution of IBM PC family systems, PC and PC XT compatible.
- World wide power supply, and system setup switches eliminated.
- Price, significantly less than comparable IBM PC XT systems.

DESCRIPTION

The Personal System/2 Model 30 utilizes integration and advanced technology to combine existing PC functions along with integrated features such as a graphics adapter and parallel port into a general-purpose computer that advances base functionality while reducing price. The system is based on an 8086 microprocessor, running at 8M Hz, with no wait states to system memory. Performance is further enhanced through the use of a 16-bit wide data path to system memory. The result is an internal processing speed ap-

proximately comparable to the Personal Computer AT model 099, and approximately twice that of the 8088 based PC XT. All models have the following features:

- 640Kb random access memory (RAM)
- Integrated diskette adapter supporting up to two 720Kb drives
- Multi Color Graphics Array (MCGA)
- Serial port
- Parallel port
- Mouse port
- Keyboard port
- Enhanced Personal Computer Keyboard
- Time-of-day clock with extended life battery
- Socket for a math co-processor
- Three general-purpose slots to accommodate PC, PC XT option cards.

Multi Color Graphics Array, the graphics adapter function that has been integrated into the planar, supports all existing Color Graphics Adapter (CGA) modes when one of the new analog displays is attached; previously announced IBM displays are not compatible. In addition to providing existing CGA mode support, four new expanded modes are included in MCGA.

- 640 by 480 by 2 colors - All Points Addressable
- 320 by 200 by 256 colors - All Points Addressable
- 40 by 25 by 16 colors - Text (8 X 16 character box)
- 80 by 25 by 16 colors - Text (8 X 16 character box)

The integrated Multi Color Graphics Array will automatically use up to 64 shades of gray in converting color modes of operations for display on the IBM Monochrome Display 8503. This allows those who prefer a monochrome display to execute color based applications.

Display Devices

- Personal System/2 Monochrome Display 8503 Model 001
- Personal System/2 Color Display 8512 Model 001
- Personal System/2 Color Display 8513 Model 001
- Personal System/2 Color Display 8514 Model 001

Note: Previously announced IBM displays are not compatible with the IBM Personal System/2.

Standard Features: The system unit contains the following major functional components:

- Intel 8086 microprocessor operating at 8M Hz clock speed
 - Zero wait states
 - 16 bit wide data path to system memory
- 640Kb RAM
- 64Kb ROM
 - Automatic power-on self-test routines
 - BASIC language interpreter
 - IBM PC, PC XT compatible BIOS
- Integrated diskette adapter supporting up to two 720Kb drives
- Direct Access Storage Devices (DASD)
 - 3.5 inch 720Kb diskette drive
 - ▲ (2) included in Model 002
 - ▲ (1) included in Model 021
 - ▲ Supports industry standard 720K-byte format
 - 3.5 inch 20Mb fixed disk and integrated controller
 - ▲ (1) included in Model 021
 - ▲ 80MS average access time
 - ▲ 180MS maximum access time
 - ▲ 512-bytes by 17 sector format
 - ▲ 20.8Mb formatted capacity
- Serial port (COM 1)
 - RS-232, V.24, V.28 compatible
 - 25-pin, D-shell connector
- Parallel port (LPT 1)
 - Centronics DIO capability
 - Equivalent to printer adapter
 - 25-pin, D-shell connector
- Keyboard port

- Enhanced Personal Computer Keyboard
- Mouse port
 - For attachment of the IBM Personal System/2 Mouse or equivalent
- Integrated display adapter - Multi Color Graphics Array (MCGA)
 - 64K multiport RAM for displays
 - CGA compatible (31.5K Hz double scanned)
 - New modes: (31.5K Hz)
 - ▲ 40 by 25 by 16 colors - Text (8 X 16 character box)
 - ▲ 80 by 25 by 16 colors - Text (8 X 16 character box)
 - ▲ 320 by 200 by 256 colors - All Points Addressable
 - ▲ 640 by 480 by 2 colors - All Points Addressable
 - Palette of 262,144 colors
 - Analog drive, sub miniature 15-pin, D-shell connector
 - 70 Hz refresh rate in all but 640 X 480 mode
 - Not compatible with digital monitors
 - Loadable character font capability (512 characters)
 - Color summing to 64 gray shades in BIOS for mono display
- World wide power supply, with internal sensing
 - Low range, 100 to 125V AC
 - High range, 200 to 240V AC
 - Frequency, 50 to 60 Hz
- Sound
 - PC equivalent single sound controller
 - Sound transducer
- PC, PC XT bus for adapter cards
 - Three expansion slots available
- Time-of-day clock with battery
 - Extended life battery

Physical Specifications:

Width: 406mm (16.0 in.)
 Depth: 398mm (15.6 in.)
 Height: 99mm (4.0 in.)
 Weight: 8kg (17.5 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60 to 90 degrees F)
 Relative Humidity: 8 to 80 percent
 Maximum Wet Bulb: 22.8 degrees C (73 degrees F)

Publications: The following publications are shipped with the specific product and, except where noted, are also available separately.

- Setup Instructions (P/N 68X2239) (S68X-2239)
- Guide to Operations (P/N 68X2230) (S68X-2230)*
- Math Co-Processor (P/N 6280152)**
- Speech Adapter (P/N 6280154)**
- Data Migration Facility (P/N 6280121)**

* GTO is also available through the Technical Directory mentioned below, and includes the Starter Diskette.

** These publications are not available separately.

The following publications are available for sale, and can be obtained by contacting an Authorized IBM Personal Computer Dealer, or an IBM Sales Representative. They may also be obtained through the Technical Directory, a copy of which is included with the initial system documentation. Please see the directory for details.

- Technical Reference Manual (P/N 68X2201) (S68X-2201)
- HMS Service Supplement (P/N 68X2202) (S68X-2202)
- HMS Reference Supplement (P/N 68X2203) (S68X-2203)
- 720KB/1.44MB Diskette Drive (P/N 68X2225) (S68X-2225)
- Fixed Disk Drive (P/N 68X2205) (S68X-2205)
- Speech Adapter (P/N 68X2207) (S68X-2207)

SPECIAL FEATURES

The following features are supported in the Personal System/2 Model 30 environment.

PC Network Adapter (#0213): This adapter allows the 8530 to be connected to an IBM PC Network. The PC Network is a low-cost broadband local area network that is designed for offices, departments, and small businesses. Using the PC Network Program, or the PC Local Area Network Program, it supports peer-to-peer communications among processors in the network. Standard broadband components and 75-ohm coaxial cable (CATV compatible) are used to provide a reliable low-maintenance network that uses carrier sense multiple access/collision detection (CSMA/CD) protocol to transmit data at 2M bps. Each processor on the network requires the Network Adapter which has a unique serial number contained in ROM that is used as the network identifier of the processor in which the adapter is installed. The Network Adapter contains an Intel 80188 processor and Intel 82586 network controller, a fixed-frequency modem and network microcode that off loads the network control and interface functions from the system microprocessor. The fixed-frequency modem operates at a 50.75M Hz transmit frequency and a 219M Hz receive frequency for transmission on a single-cable broadband network. Direct memory access is used for data transfer. The network microcode (NETBIOS) which resides in the Network Adapter's ROM, is the basis of program control of the network. NETBIOS supports up to 32 peer-to-peer sessions active at one time. The Network adapter is provided with a 9-ft. cable for attaching the processor to the 5178 Network Translator Unit. Additional PC Network Cabling Components connect to allow the processor with the Network Adapter to be located up to 1,000 ft. from the 5178 Unit. Each user who is to share an application program on a PC Network must be licensed to use that program. This adapter requires one expansion slot.

Serial/Parallel Adapter (#0215): This option provides a serial port and a parallel port. It occupies only one expansion slot. The serial portion is fully programmable and supports asynchronous communications from 50 to 9600 bps. The back of the adapter has a 9-pin D-shell connector that is classified as an RS-232-C port. When the optional 10-foot Serial Adapter Cable (#0217) or 10-inch Serial Adapter Connector (#0242) is connected to the adapter, the 25-pin end of the cable or connector has all the signals of a standard EIA RS-232-C interface. The parallel portion of the adapter provides the ability to attach various devices that accept eight-bits of parallel data. The parallel port is provided by a 25-pin, D-shell connector. Maximum: Two. Limitations: This adapter does not support current loop operation. The 5218 Printer is not supported. This adapter requires one expansion slot.

Serial Adapter Cable (#0217): This is a 3m (10 ft) cable with a 25-pin D-shell connector providing all the signals of an EIA RS-232-C interface which can connect the Serial Adapter port to an appropriate serial device.

PC Network Base Expander (#0230): When installed in the 5178 PC Network Translator Unit, provides the ability to attach up to eight Short Distance Kits, Medium Distance Kits, and/or Long Distance Kits in any combination to further extend the distance between the system with the Network Adapter installed and the 5178 Unit. Field Installation: Yes. Customer Setup: Yes.

PC Network Short Distance Kit (#0231): Provides one-foot of cable to attach a processor with a PC Network Adapter to the Network Base Expander (#0230) in order to extend the distance between the processor and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight Network Distance Kits may be used.

PC Network Medium Distance Kit (#0232): Provides 400 feet of cable to attach a processor with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the processor and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight Network Distance Kits may be used.

PC Network Long Distance Kit (#0233): Provides 800 feet of cable to attach a processor with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the processor and the 5178 Unit, when used in combination with PC Network Cabling Segments. Limitations: A maximum of eight Network Distance Kits may be used.

Network Cabling Segment (#0234, 0235, 0236, 0237):

- PC Network 25 Foot Cabling Segment (#0234)
- PC Network 50 Foot Cabling Segment (#0235)
- PC Network 100 Foot Cabling Segment (#0236)
- PC Network 200 Foot Cabling Segment (#0237)

Provides four different cable length segments to attach a processor with a PC Network Adapter to the PC Network Base Expander (#0230) in order to extend the distance between the processor and the 5178 Unit, when used in any combination with one of the PC Network Distance Kits. Limitations: A maximum of eight Network Distance Kits may be used. Field Installation: Yes. Customer Setup: Yes.

PC Network Transformer Unit (#0238): This unit is packaged separately, but is required for the operation of the PC Network Translator Unit (#5178). It is a 120V transformer which plugs into a standard grounded outlet. Customer Setup: Yes. Order as a feature for 5778-001.

Serial Adapter Connector (#0242): This adapter is a 10-inch cable with a 25-pin D-shell connector providing all the signals for an EIA RS-232 interface for connecting the Serial Adapter port to an appropriate serial device which has its own cable. Customer Setup: Yes.

Binary Synchronous Communications (BSC) Adapter (#1204): The BSC Adapter provides an EIA RS-232-C interface. A maximum of two BSC Adapters may be installed. Only one BSC Adapter may be installed if an SDLC Adapter is installed. This adapter requires one expansion slot.

SDLC Communications Adapter (#1205): The SDLC Communications Adapter provides an EIA RS-232-C interface. Only one SDLC Adapter may be installed. This adapter requires one expansion slot.

(Except LAD > PC Network Adapter II (#1220, P/N 1501220): This feature card was specifically designed for connecting the Personal System/2 Model 30 to a PC Network. It is compatible with the form factor and bus design of the original IBM Personal Computer, yet is designed to take advantage of Model 30's greater processing speed.

Software Requirements: IBM Personal Computer DOS 3.2 or higher, or equivalent; IBM PC Network Protocol Driver or IBM LAN Support Program. Limitations: A system using the Protocol Driver cannot communicate with a system using the LAN program. Size and distance limits of the network are the same as for the current PC Network in either case. This adapter requires one expansion slot. <)

PC Network Baseband Adapter (#1221, P/N 1501221): This feature card was specifically designed for connecting the Personal System/2 Model 30 to the PC Baseband Network. It is compatible with the form factor and bus design of the original IBM Personal Computer.

Software Requirements: IBM Personal Computer DOS 3.2 or higher, or equivalent, and the IBM LAN Support Program. Limitations: A system using this feature operates together with similarly equipped processors in either a daisy chained or star configuration. When used together with the Baseband Extender (#5173) in a star configuration, larger networks are achieved. In addition, processors equipped with the IBM PC Network Baseband Adapter/A can coexist in the same network. Consult the IBM PC Network Planning Guide for further information. This adapter requires one expansion slot.

Game Control Adapter (#1300): The Game Control Adapter can have up to two joysticks or up to four game paddles attached. This adapter can also be used as a general purpose I/O card with four analog (resistive) inputs plus four digital input points. This adapter requires one expansion slot.

Data Acquisition and Control Adapter (#1502): Provides analog input/output channels and digital input/output ports to receive data from and send data to instruments and devices for the purpose of data acquisition, control, analysis and quality control testing in laboratory, pilot plant or full-scale production lines. The adapter pro-

vides four analog input channels with throughput to memory at 15,000 conversions per second, two analog output channels with throughput to memory at 25,000 conversions per second both with 12-bit resolution and user-selectable unipolar or bipolar modes, 16 digital input lines and 16 digital output lines with programmed or interrupting mode of operation for analog input/output channels and programmed I/O mode for digital input/output. There is a 16-bit programmable binary counter that can be used as an event counter, as a programmable rate generator, or for programmable time delay. Prerequisites: An available slot in the 8530 for each adapter desired. Maximum: Three.

General Purpose Interface Bus Adapter (#1503): Provides an interface between the IBM Processor and the IEEE-488 General Purpose Interface Bus (GPIB), allowing control of up to 48 devices or instruments (such as plotters, multimeters and disk drives). The adapter is designed to the ANSI/IEEE-488 standard, including the 488-1980 supplement, and supports up to 14 devices or instruments. The adapter provides a direct memory access data rate of up to 300K bps and programmed I/O data rate of up to 10K bps. It allows the user to select interrupt level and memory access channels. Prerequisites: An available slot in the 8530 for each adapter desired. Limitations: This adapter card should be inserted in either of the bottom two slots in the 8530. Maximum: One.

Data Acquisition and Control Adapter Distribution Panel (#1504): Provides easy access to the I/O signals, voltages and grounds of the Data Acquisition and Control Adapter (#1502) and is connected to that adapter by a shielded flat cable 34-inches long that is permanently connected to the panel. The distribution panel is a printed circuit board with four barrier-type screw terminal strips, which provide a total of 88 terminations. The circuit board is housed in a metal enclosure that is slotted to allow user cabling to enter and exit the panel. This panel can be used to quickly connect, change or remove instruments and/or control points being used. Prerequisites: An Acquisition and Control Adapter for each panel desired. Maximum: Three.

Communications Adapter Cable (#2067): The Communications Adapter Cable feature supports the attachment of a modem to the BSC adapter or SDLC adapter card connector at the rear of the 8530. The cable is double-shielded and approximately 3m (10 ft.) long. A wrap connector is provided to test the cable. This cable is required to connect the BSC or SDLC adapter to an external modem or other data communications equipment.

Integrated Attachment Cable (#2877): Required to permit attachment of the Enhanced Display Station Emulation Adapter to the system twinaxial cables of the S/34, S/36, S/38, 5294 Remote Control Unit. Prerequisites: Enhanced Display Station Emulation Adapter. Maximum: One. Field Installation: Yes.

(Except Canada > Enhanced 5250 Display Station Emulation Convenience Kit Version 2.12 (#2910): Provides the following items necessary to permit attachment of the 8530 to the S/34, S/36 or S/38:

- The Enhanced Display Station Emulation Adapter, Enhanced 5250 Emulation Program Version 2.12, integrated attachment cable, Keyboard Enhanced 5250 Emulation Program Version 2.12 template, and manuals necessary to install the Enhanced Display Station Adapter and Enhanced 5250 Emulation Program in the IBM Personal System/2 Model 30.
- Allows connection of the 8530 as a peripheral to the S/34, S/36, or S/38 as a locally connected workstation, or remotely to a S/36 or S/38 via a 5294 Remote Control Unit. The 8530 in 5250 emulation mode has access to all the functions of the host system available to a display station operator, providing the user with the power of the S/34, S/36, or S/38. The 8530 can also operate as a stand-alone system.

Ordering Information: Order #2910 under Software Ordering Vehicle 5871 Model AAA. Maximum: One. Prerequisites: An available system expansion slot, and a supported display. Limitation: See Announcement letter <.) (Except Canada > dated February 3, 1987.

IBM Personal Computer Disk Operating System (DOS) 3.30 is required. <)

Enhanced 5250 Display Station Emulation Adapter Kit Version 2.12 (#2911): Permits an 8530 to be connected to a S/34, S/36, or S/38 directly, or remotely via the 5294 Remote Control Unit to emulate a 5250 workstation. This adapter is supported by the Enhanced 5250 Emulation Program. As a 5250 workstation, the 8530 can emulate a 5291 or 5292 display and a 5256 or 5219 printer. Access to the 8530 fixed disk during execution of the Enhanced 5250 Emulation Program is supported. One or two host sessions and one native mode session can be active concurrently. Customer Setup: Yes. Maximum: One. Prerequisites: An available expansion slot in the 8530.

Token-Ring Network PC Adapter Cable (#3390): The 2.4m (8 ft) cable is used to attach the IBM Personal System/2 Model 30 with a network adapter to the IBM Cabling System or directly to an access unit.

Token-Ring Network PC Adapter (#3391): The Token-Ring Adapter is a feature card which contains a microprocessor operating under control of adapter resident microcode. The adapter transmits and receives at a speed of 4M bps using protocols conforming to IEEE 802.5 and ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard. Diagnostics invoked during adapter initialization verify the adapter operation and check-out the cabling to the access unit. The adapter detects permanent errors, such as loss of receive signal, and generates a notification signal to initiate automatic network recovery. Recoverable errors, such as bit-errors in the transmitted message, are detected by the adapter for subsequent reporting to a ring diagnostic program.

A diskette is included with the adapter, and supports the operation and testing of the adapter and network. The adapter handler program provides programming interface for the adapter. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as an aid in problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented. A 5.25 inch diskette is included with this adapter. Personal System/2 Model 30 (8530) users should also order Feature Code #6042 to receive a 3.5 inch diskette.

A supplement to the "IBM Personal Computer Guide to Operations" is included with the adapter. It contains installation instructions for the adapter and adapter support programs. Prerequisite: An IBM Token-Ring Network Adapter Cable (#3390) is required for connecting this feature to the Token-Ring Network wired with IBM Cabling System data grade media. (For Type 3 telephone media installations, see IBM Product Announcement dated October 15, 1985). Refer to this product announcement for additional IBM Token-Ring Network information. See Features #6042 and #6043 for related options.

2MB Expanded Memory Adapter (#3905, P/N 2685193): Provides 2MB of Expanded Memory function and a Standard Parallel Printer Port for the Personal System/2 Model 30. The 2MB Expanded Memory Adapter supports the device drivers resident within the 3270 Workstation program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces. The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICRO-SOFT.

The 2MB Expanded Memory Adapter may be installed in any full length slot of a Personal System/2 Model 30.

The 2MB Expanded Memory Adapter will backfill conventional memory from the 256KB address to the 640KB address. It is not necessary to use separate memory modules or cards for this purpose. The remainder of the adapter memory will be available for the "Expanded Memory Specification" function. Up to two PC DOS virtual disk applications may run under "Expanded Memory Specification". The 2MB Expanded Memory Adapter may be apportioned to the virtual disk and other "Expanded Memory Specification" application programs in 16KB increments. The 3270 Workstation program Versions 1.0 or 1.1 contain drivers. These "Expanded Memory Specification" device driver programs provide a set of standard routines that allow applications to access memory on the adapter (up to 2MB) through four 16KB pages within the IBM Personal Com-

puter address space. Customer Setup: Yes. Limitations: One 2MB Expanded Memory Adapter. Field Installation: Yes.

Personal System/2 Display Adapter (#4050, P/N 1887744): The Personal System/2 Display Adapter offers support for text, image and graphics applications. In addition to emulating and in some cases enhancing the existing modes of the IBM Monochrome Display and Printer Adapter, the IBM Color/Graphics Monitor Adapter and the IBM Enhanced Color Display Adapter following new display modes are supported.

- 640 x 480 pels in 16 colors or gray scales
- 720 x 400 pels in 16 colors or gray scales
- 320 x 200 pels in 256 colors or 64 gray scales

The Personal System/2 Display Adapter provides support for attachment of one of the following displays: 8503, 8512, 8513 and 8514.

6157 Streaming Tape Drive Adapter (#4156): This adapter supports the attachment of a 6157 Streaming Tape Drive, which provides for data interchange as well as fixed disk backup and restore at rates up to 5MB/minute in image dump mode. Maximum: One. This adapter requires one expansion slot.

5364 Driver Card (#4548): Allows connection to the S/36 5364 System Unit. See 5364 product description for limitations, ordering information and additional information. The 5364 Driver Card is shipped with the 5364. Prerequisite: The 5364 attachment code provided with System/36 SSP (5727-SS6), Release 5.1. This adapter requires one expansion slot.

High Speed Adapter (#4920), (P/N 6456750): The High Speed Adapter is designed to provide an RS-422-A standard interface for attachment of the 3118 Scanner and 3117 Scanner with Extension Unit attachment to the 8530. The High Speed Adapter permits the 3118 Scanner or the 3117 Scanner with Extension Unit to send image data to the 8530 at a maximum speed of 1MB per second, using the RS-422-A interface. This adapter requires one expansion slot. Maximum: One. Cable: A Communication Adapter Cable (#2067). Field Installation: Yes. Prerequisites: An available expansion slot. Customer Setup: Yes.

Publication: Guide To Operations and its supplement

Specify	Language
#2701	English US
#2753	Canadian French
#2707	Spanish

Publications available at a fee for the IBM Personal Computer High Speed Adapter are:

High Speed Adapter Guide To Operations (consists of the 5.25 inch diagnostic diskette and its instructions)

P/N	Form #	Language
6456788	GA18-2476	English US
6456785	GA10-0125	Spanish
6456786	GA09-0378	Canadian French

Supplements to High Speed Adapter Guide To Operations (consists of the 3.5 inch diagnostic diskette and its instructions)

P/N	Form #	Language
65X1870	GK2T-0955	English US
65X2012	GY10-4009	Spanish

High Speed Adapter Hardware Maintenance and Service

P/N	Form #	Language
6455787	SY18-2167	English US
6455788	SY11-1017	French

Supplement to High Speed Adapter Hardware Maintenance and Service (consists of the 3.5 inch diagnostic diskette and its instructions)

P/N	Form #	Language
65X1870	GK2T-0955	English US
65X2005	SY11-1035	French

High Speed Adapter Technical Reference

P/N	Form #	Language
6455771	SC18-2117	English US

3117 Adapter (#4925) (P/N 6456806): The 3117 Adapter is designed to provide the capability of attaching the 3117 Scanner to the 8530. The 3117 Adapter provides the function of 3117 mechanical control, Charged Couple Devices (CCD) image sensor control, and video signal processing to capture image data from 3117 Scanner Operations. A 3117 PC Cable (3117 Scanner feature #3003, P/N 6456807) is required for connecting the adapter to the 3117 Scanner. This adapter requires one expansion slot. Maximum: One. Cable: A 3117 Personal Computer Cable (#3003). Field Installation: Yes. Prerequisites: An available expansion slot. Customer Setup: Yes.

Publication: Guide To Operations and its supplement

Specify	Language
#2701	English US
#2751	Canadian French
#2708	Spanish

Publications available at a fee for the IBM Personal Computer 3117 Adapter are:

Guide To Operations for the IBM 3117 Scanner and the 3117 Adapter (consists of the 5.25 inch diagnostic diskette and its instructions)

P/N	Form #	Language
6456831	GA18-2477	English US
65X1747	GA09-0375	Canadian French
65X1745	GA10-8813	Spanish

Supplements to Guide To Operations for the IBM 3117 Scanner and the 3117 Adapter (consists of the 3.5 inch diagnostic diskette and its instructions)

P/N	Form #	Language
65X1877	GK2T-0954	English US
65X1891	GY10-4008	Spanish

IBM 3117 Scanner Hardware Maintenance and Service

P/N	Form #	Language
65X1841	SY18-2159	English US
65X1822	SY11-1018	French

Supplements to IBM 3117 Scanner Hardware Maintenance and Service (consists of the 3.5 inch diagnostic diskette and its instructions)

P/N	Form #	Language
65X1874	SK2T-0956	English US
65X1894	SY11-1036	French

IBM 3117 Scanner Technical Reference

P/N	Form #	Language
65X1844	SC18-2105	English US

Personal System/2 8087 Math Co-Processor (#5001): This feature is a high-performance numeric 8087 co-processor extension with floating point, extended integer, and BCD data types. When installed, it works in parallel with other system functions and enables the system to perform high-speed arithmetic, logarithmic functions, and trigonometric operations. This feature is inserted into the math co-processor socket on the system board and does not require an expansion slot.

Personal System/2 Speech Adapter (#5002): This adapter allows the user to add voice capability to the 8530 Personal Computer. It provides two technologies for speech reproduction: speech encoding (speech to data) and decoding (data to speech) using a Continuously Variable Slope Delta (CVSD) modulation technique, and

speech synthesis using Linear Predictive Coding (LPC). Non-application-oriented software support needed to control the Speech Adapter is incorporated into an internal ROM module. This adapter requires one expansion slot. Customer Setup: Yes. Limitation: The Speech Adapter and the 3278/79 Emulation Adapter (#5050) cannot be installed in the same system unit.

Personal System/2 Data Migration Facility (#5003): This connecting tool provides an easy method for customer file transfers from an installed PC with a 5.25 inch diskette drive to the Personal System/2. It will operate via the printer cable on the existing system and the parallel port on the new. The product packaging contains a 5.25 inch diskette with a "send" program, the connector itself, and the appropriate instructions for use. A "receive" program, also required, has been included on the 3.5 Inch Starter Diskette packaged with each Personal System/2. DOS is required for both the sending and receiving systems. Level 2.0 or higher is required on the sending system, and 3.30 for reception. The printer cable must be attached to one of the following printer cards on the host PC. PC XT, or Personal Computer AT:

- Printer Adapter (#5200)
- Monochrome Display and Printer Adapter (#4900)
- Serial/Parallel Adapter (#0215)

Copying Licensed Programs: IBM grants the user permission to copy IBM Licensed Programs, using this Data Migration Facility, to a new medium. No additional rights are granted to the user beyond those stated in the original IBM Program License Agreement. Therefore, use of an IBM program remains restricted to one machine at a time unless otherwise stated by IBM.

General Purpose Interface Bus (GPIB) Cable (#5040, P/N 63X4882): The General Purpose Interface Bus Cable provides the IEEE-488 communications link between the 8530 and external device, for example the IBM InfoWindow Display. Field Installation: Yes. Prerequisites: General Purpose Interface Bus Adapter (#1503). Customer Setup: Yes.

3278/3279 Emulation Adapter (#5050, P/N 83X9670): Expands the capabilities of the 8530 by providing coaxial cable attachment to the 3174, 3274 and 3276 Control Unit, the 4321, 4331 or 4361 Processor Display/Printer Adapter, the 4361 Workstation Adapter, or the 4701 Finance Communication Controller. When used with the IBM PC 3270 Emulation Program, Entry Level, the 8530 can emulate the functions of a 3278 Display Station Mdl 2 or a 3279 Color Display Station Mdl 2A or S2A and can support file transfer with the host. Both the host-controlled 3270 session and a local IBM Personal System/2 DOS Session can be active concurrently and the user can interact with either session alternately. Maximum: One. Customer Setup: Yes. Limitation: The 3278/79 Emulation Adapter and the Speech Adapter (#5002) cannot be installed in the same system unit. Prerequisites: An available 8530 expansion slot. A customer supplied attachment cable is required for host system attachment. Software such as the PC 3270 Emulation Program, Entry Level, or other communications software is required. For file transfer, a 3270-PC File Transfer Program (such as 5664-281 for VM/SP or 5665-311 for MVS/TSO) or equivalent is required. For attachment to the 4321 or 4331, specify code #9843 must be installed on the 4321 or 4331. See Specific 4700 product descriptions for 4700 attachment prerequisites.

Token-Ring Network PC Adapter II (#5063): This option provides an alternative for attaching the Personal System/2 Model 30 to the Token-Ring Network. In addition to the function provided by the Token-Ring Network Adapter (#3391), this feature can be used to attach devices which require additional RAM for increasing message segment size and/or increasing the number of link stations supported by the adapter. For example, the Token-Ring Network PC Adapter II in a server may improve performance when multiple workstations require simultaneous access to the server. This option includes the adapter card, diskette, and supporting documentation. The diskette includes adapter and ring diagnostics, and an adapter handler program that provides a programming interface to the adapter. A 5.25 inch diskette is included with this adapter. Personal System/2 Model 30 users should also order Feature Code #6042 to receive a 3.5 inch diskette. Customer Setup: Yes. Prerequisites: Requires a system expansion slot, the IBM Personal Computer Disk Operating System (DOS), and an attachment cable

(#3390) for attaching to the IBM Cabling System data grade media or a filter (available from cabling system distributors) for attaching to IBM Cabling System Type 3 specified telephone media.

InfoWindow Enhanced Graphics Adapter (IEGA) (#5240, P/N 56X2412): Provides the digital RGB text and graphics to the InfoWindow Display. Up to 640 x 350 resolution for high definition graphics and 8 x 14 pel character quality for text. Allows up to 16 colors selectable from a 64 color palette under program control. Field Installation: Yes. Prerequisites: Enhanced Graphics Adapter Jumper Card (#6583). This adapter requires one expansion slot. The InfoWindow environment also requires the GPIB Adapter (#1503) and GPIB Cable (#5040). Customer Setup: Yes.

(Except LAD> PC Music Feature (#6011, P/N 81X8630): The PC Music Feature is compatible with the Personal Computer 5150, Personal Computer XT 5160, Personal Computer XT-286 5162, Personal Computer AT and IBM System/2 Model 25 (8525) and 30 (8530). Special features include FM Stereo Sound output with 336 voices/instruments, 240 which are pre-set and 96 which are user programmable. Up to eight voices/instruments may be selected simultaneously permitting an ensemble performance. Limitations: A maximum of two (2) PC Music Feature cards can be installed in a system unit. The PC Music Feature is not supported on the IBM PCjr, IBM PC Portable or the IBM PC Convertible. Prerequisites: The PC Music Feature can only be installed in an open full length card slot in the system unit. Customer Setup: Yes. <)

(Except LAD> The IBM Music Feature supports US English only. The customer setup documentation and the user guide are available in US English only. No other language is supported. <)

(Except LAD> Highlights:

- Stereo FM Synthesized Sound
- Headphone Connection of private listening
- Compatibility MIDI 1.0 conforming devices
- Sound generation independent of the PC CPU

Physical Specifications:

Width - 20.32mm (0.8 in.)
Depth - 336mm (13.26 in.)
Height - 107.95mm (4.25 in.)
Weight - 0.34kg (0.75 lbs.)

Operating Environment:

Temperature: 15.6 to 32.2 degrees C (60.00 to 90.0 degrees F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8 degrees C (73.4 degrees F)

Publications:

- Hardware Maintenance Service Supplement (P/N 75X1049)
- Technical Reference Supplement (P/N 75X1048) <)

Token-Ring Network PC Adapter Diskette 3.5 Inch (#6042, P/N 67X0410): The Token-Ring Network PC Adapter Diskette (3.5 inch) is a duplication of the 5.25 inch diskette provided with the Token-Ring Network PC Adapter and is required for Personal System/2 Model 30 machines which have 3.5 inch diskette input capabilities only. This diskette contains the programming interface to the adapter card and diagnostics necessary to test the adapter and assist with ring problem determination. This capability is required for all Personal System/2 Model 30 machines installed on a Token-Ring Network. Prerequisites: The Token-Ring Network PC Adapter Diskette (3.5 inch) requires a Token-Ring Network PC Adapter to be installed. Refer to Product Announcement dated 10-15-85 for IBM Token-Ring Network PC Adapter requirements.

P/N	Language
67X0410	English US
83X8815	French
83X8816	German
83X8817	Italian
83X8818	Spanish

Token-Ring Network PC Adapter Hardware Maintenance and Service Addendum (#6043, P/N 83X8851): This addendum is a duplication of the 5.25 inch diskette provided with the optional IBM Token-Ring Network PC Adapter Hardware Maintenance and Service feature and is required only when it is desirable to support a Personal System/2 Model 30 under this option. Refer to Product Announcement dated 10-15-85. Prerequisites: The IBM Token-Ring Network PC Adapter Hardware Maintenance and Service Addendum requires an IBM Token-Ring Network PC Adapter Hardware and Maintenance Service installed.

4700 Finance Communication System Security Option (#6069): This option allows the user to encrypt and decrypt data in an application program for communication and files using the American National Standards Institute (X3.92-1981) Data Encryption Algorithm (DEA).

Realtime Interface Co-Processor (#6165, #6166): The IBM Realtime Interface Co-Processor can be connected to a wide variety of industrial devices and systems. It provides the capability of off-loading applications and device drivers from the Industrial or Personal Computer processor, thus providing a dedicated high-performance subsystem for these applications.

The Co-Processor is based on a high-performance, 16-bit Intel(1) 80186 microprocessor. Provided as a standard feature are two independent serial ports that operate at speeds up to 64K bps using direct memory access. One port can operate at 64K bps full duplex, while the second is operated at a maximum of 19.2K bps full duplex. These ports can be programmed for asynchronous, bit synchronous, and character synchronous protocols, using either direct memory access or interrupt mode. In order to accommodate the different possible physical interfaces encountered in industrial environments, the Co-Processor is designed to accept two optional interface boards or user developed custom interface boards. These pluggable interface boards allow the user to selectively configure the ports of the Co-Processor. The optional interface boards available for the Interface Co-Processor are:

- EIA RS-232-C/CCITT V.24 Interface Board
- EIA RS-422-A Interface Board
- 20ma Current Loop Interface Board
- CCITT V.35 Interface Board

A maximum of two Interface Boards may be installed on the Co-Processor. Interface Boards may be installed in any combination. For those users with unique Interface Board requirements, detailed technical information on Interface Board design can be found in the optional "Realtime Interface Co-Processor Technical Reference" (#6058).

The Co-Processor's memory is dual ported. Communications between the Co-Processor and the system unit are done via I/O ports and shared memory. Communication is synchronized by interrupts between the Co-Processor and system unit. Interrupt levels are selectable.

The IBM Realtime Interface Co-Processor will be available with either 128KB or 512KB of standard memory and 3.5 inch program media.

- IBM Realtime Interface Co-Processor with 128KB of memory and 3.5 inch program media (#6165)
- IBM Realtime Interface Co-Processor with 512KB of memory and 3.5 inch program media (#6166)

All Realtime Interface Co-Processor features are functionally equivalent. Feature #6155 is shipped with 128KB of memory, upgradable to 256KB, and feature #6166 is shipped with 512KB of memory, upgradable to 1,024KB. To expand the memory capacity of the Realtime Interface Co-Processor, the following expansion options are available:

- 128KB Memory Expansion Option (#6055) (Can only be used with feature #6165)
- 512KB Memory Expansion Option (#6161) (Can only be used with feature #6166)

Publications:

The Realtime Interface Co-Processor will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations

Additional copies of the manual will not be available.

The following manuals are available for purchase:

- #6058 IBM Realtime Interface Co-Processor Technical Reference
- #6059 IBM Realtime Interface Co-Processor Hardware Maintenance and Service

Supporting Features:

EIA RS-232-C/CCITT V.24 Interface Board (#6051): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-232-C and CCITT V.24 interfaces.

EIA RS-422-A Interface Board (#6064): Adapts one of the Co-Processor's serial ports for compatibility with EIA RS-422-A interfaces. This board supports cable lengths up to 4,000 ft., however, these cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

CCITT V.35 Interface Board (#6053): Adapts one of the Co-Processor's serial ports for compatibility with CCITT V.35 interfaces.

20ma Current Loop Interface Board (#6066): Adapts one of the Co-Processor's serial ports for compatibility with 20ma interfaces. The current loop interface board also has the capability to provide the 20ma current source if required. The line speed at which this board can operate is dependent on the type and length of cable used. These cables should never exit the establishment. See the "IBM Realtime Interface Co-Processor Technical Reference" for details.

EIA RS-232-C Direct Attach Interface Cable Option (#6056): Allows the user to connect one port of the Realtime Interface Co-Processor directly to other devices without using a modem. The cable is shielded and is approximately 2m (6 ft.) long. The cable terminates in a 25-pin female connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

EIA RS-232-C Modem Attach Interface Cable (#6057): Allows the user to connect one port of the Realtime Interface Co-Processor to a modem. The cable is shielded and is approximately 2m (6 ft.) long. The cable terminates in a 25-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the EIA RS-232-C/CCITT V.24 Interface Board (#6051) is installed.

CCITT V.35 Interface Cable (#6061): Allows the user to connect one port of the Realtime Interface Co-Processor to a CCITT V.35 modem. The cable is shielded and is approximately 2m (6 ft.) long. The cable terminates in a 34-pin male connector. A wrap connector is provided to test the cable with the Advanced Diagnostics.

Note: This cable can be used only when the CCITT V.35 Interface Board (#6053) is installed.

Software Requirements:

The IBM Personal Computer Disk Operating System (DOS, version 2.1, 3.0, 3.1 or 3.2) is required for use of the Realtime Interface Co-Processor support software.

Applications for the Realtime Interface Co-Processor must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM Assembler, IBM BASIC, IBM C Language, or IBM PASCAL. To operate the Realtime Interface Co-Processor, application code is required for both the system processor and the Realtime Interface Co-Processor. To aid in developing these applications the following are available:

- #6058 IBM Realtime Interface Co-Processor Technical Reference
- #5669-177 Realtime Control Program DOS Support
- #5656-094 Realtime Interface Co-Processor C Language Support
- #5669-176 Realtime Interface Co-Processor Developer's Kit

IBM Realtime Interface Co-Processor Multiport (#6241): The IBM Realtime Interface Co-Processor Multiport adapter is designed as a single-slot multiple device interface subsystem for IBM Personal Computers and IBM Industrial Computers. This feature includes the realtime control microcode which provides a realtime, multitasking operational environment for supporting applications running on the Co-Processor. The Co-Processor is designed to attach to a wide variety of equipment. The Co-Processor is based on a high-performance Intel(1) 80186 microprocessor with up to 512KB of user memory. Typical applications include protocol and/or data conversion for outboard devices, multiline communication concentrator, and other functions to offload the Personal or Industrial Computer.

The IBM Realtime Interface Co-Processor Multiport will be available as follows:

- Realtime Interface Co-Processor Multiport 4 Port, 128KB Memory, 3.5 inch media (#6241, P/N 00F5527)

(1) Registered trademark of Intel Corporation

Programming Requirements:

- IBM Personal Computer Disk Operating System (DOS, 5870-LLA, Version 3.3)
- IBM Realtime Control Program DOS Support (5669-177, Version 1.02 or later)

Applications for the Realtime Interface Co-Processor Multiport must be written in IBM Personal Computer Assembler Language or IBM Personal Computer C Language. Applications for the system unit processor can be written in IBM PC Assembler, IBM interpretive and compiled BASIC, IBM C Language, or IBM PASCAL.

To operate the Realtime Interface Co-Processor Multiport, application code is required for both the system processor and the Co-Processor. To aid in developing these applications the following are available:

- Realtime Interface Co-Processor Technical Reference (SC28-8006)
- Realtime Interface Co-Processor C Language Support (5656-094)
- Realtime Interface Co-Processor Developer's Kit (5669-176)

Customer Setup (CSU): Yes.

Publications: The Realtime Interface Co-Processor Multiport will be shipped with one manual:

- IBM Realtime Interface Co-Processor Guide to Operations

Additional copies of this publication will not be available.

The following manuals are available for purchase:

- SC28-8006 IBM Realtime Interface Co-Processor Technical Reference
- SC28-8005 IBM Realtime Interface Co-Processor Hardware Maintenance and Service

Special Features: The following may be ordered from your IBM marketing representative:

Realtime Interface Co-Processor 512KB Memory Expansion (#6242, P/N 00F5529): Replaces the 128KB of Co-Processor memory with 512KB of memory. This feature upgrades the Co-Processor #6241 to the maximum memory capacity of 512KB.

Realtime Interface Co-Processor Multiport Four Port Addition (#6245, P/N 00F5530): Provides four additional EIA RS-232-C/CCITT V.24 serial I/O ports. Only one Four Port Addition may be installed to present a maximum of eight ports for each Multiport adapter.

EIA RS-232-C Multiport Interface Cable (#6246, P/N 00F5531): This cable is used to distribute eight (8) electrical interfaces away from the physical constraints of the back panel of the Industrial Computer or Personal Computer. One end of the cable provides for 78-pin connector to mate with the Co-Processor card. At the other end of the cable are eight (8) 25-pin connectors which will connect up to eight (8) EIA RS-232-C/CCITT V.24 devices. A wrap connector is provided to test the cable when using the diagnostics provided.

Enhanced Graphics Adapter Jumper (EGA) Card (#6583): Provides an external synchronization from the IBM 4055 InfoWindow Display to allow text and graphics stored on the IBM Personal System/2 Model 30 (8530) to overlay motion or still frame video stored on a video disc player and displayed on the 4055 InfoWindow. Technical Information: The IBM EGA Jumper Card attaches to the feature connector of the InfoWindow Enhanced Graphics Adapter and to the IBM General Purpose Interface Bus Adapter (IRQ connector Row B, pins 2-6). Maximum: One. Field Installation: Yes. Prerequisites: IBM General Purpose Interface Bus Adapter (#1503) and the InfoWindow Enhanced Graphics Adapter (#5240). Customer Setup: Yes.

4683 Model 2 Attachment Adapter Kit (#8314) (P/N 83X7654): The 4683 Model 2 Attachment Adapter Kit provides the necessary adapter card, software, diagnostics, installation aid and instructions for attaching one or two 4683 Model 2 to an IBM Personal System/2 Model 30. The kit consists of the following:

- IBM 4683 Model 2 Adapter Card and Wrap Plug
- Ship Group that contains:
 - Local Accessory Kit
 - Diskette Kit

Publications:

- IBM 4683 Model 2 Attachment Adapter Kit: Installation Guide
- IBM 4683 Model 2 Attachment Adapter Kit: Problem Determination Manual
- IBM 4683 Store System Terminal Operations Guide
- Guide to Operations Personal Computer: 4683 Model 2 Attachment Adapter

The combination of the 4683 Model 2 and Attachment Adapter Kit connected to and installed on Personal System/2 Model 30, described in the specified operating environment, provides the capability to attach up to two 4683 Model 2 Point-of-Sale Terminals. The Attachment Kit is applicable to all small store environments where an in-store Personal System/2 Model 30 and Application Program are available to meet the requirements. Limitations: Maximum of one Attachment Adapter. Prerequisites: An available full-feature slot in the system unit. Field Installation: Yes. Customer Setup: Yes.

IBM Personal Pageprinter Adapter (#7001): Provides a component of the IBM SolutionPac Personal Publishing System for users who wish to acquire the components and configure a unique solution utilizing the IBM Personal Pageprinter 4216 Model 020. Included is a M68000 coprocessor, 0.5Mb of program memory, 2Mb of page buffer memory, a high speed video interface and a 2m (6 ft.) cable of attachment to the 4216 Pageprinter. Prerequisite: An available expansion slot in the 8530. Maximum: One. Customer Setup: Yes.

Personal System/2 5.25 Inch External Diskette Drive Adapter (#8750): This attachment allows the 4869 to be connected to the 8530 Model 021. It is a half length feature card and it occupies one expansion slot in the 8530 system. The back of the card has a 37-pin D-shell connector which allows the 4869 external diskette drive unit to be attached. The 8530 system "B" drive connector plugs onto the

2x20 edge connector on the feature card. When installed, it becomes the "B" drive. Prerequisites: An available slot in the 8530 Model 021. Maximum: One.

Personal System/2 Mouse (#8770): This option is a 2-button mechanical mouse for those users whose applications are more efficiently operated using this type device. The mouse plugs into the system unit and no additional hardware features are required. It does not require external power. A device driver is packaged with each mouse for addition to the operating system.

SPECIFY (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

Personal System/2 Data Migration Facility (#5003): This connecting tool provides an easy method for customer file transfers from an installed PC with a 5.25 inch diskette drive to the Personal System/2. It will operate via the printer cable on the existing system and the parallel port on the new. The product packaging contains a 5.25 inch diskette with a "send" program, the connector itself, and the appropriate instructions for use. A "receive" program, also required, has been included on the 3.5 Inch Starter Diskette packaged with each Personal System/2. DOS is required for both the sending and receiving systems. Level 2.0 or higher is required on the sending system, and 3.30 for reception. The printer cable must be attached to one of the following printer cards on the host PC, PC XT, or Personal Computer AT:

- Printer Adapter (#5200)
- Monochrome Display and Printer Adapter (#4900)
- Serial/Parallel Adapter (#0215)

Copying Licensed Programs: IBM grants the user permission to copy IBM Licensed Programs, using this Data Migration Facility, to a new medium. No additional rights are granted to the user beyond those stated in the original IBM Program License Agreement. Therefore, use of an IBM program remains restricted to one machine at a time unless otherwise stated by IBM.

Enhanced Personal Computer Keyboard Accessories

- Clear Keycaps (60) with paper inserts (P/N 6341707)
- Blank Light Keycaps (P/N 1351710)
- Blank Dark Keycaps (P/N 1351728)
- Paper Inserts (300) (P/N 6341704)
- Keycap Removal Tools (6) (P/N 1351717)

(Canada only) Accessories can be ordered through the National Distribution Division (NDD), Dayton, NJ, using the appropriate part numbers, or by calling IBM Direct on 1-800-426-2468. <)

MACHINE ELEMENTS (NONE)

SUPPLIES

- 3.5 Inch, 1.0Mb Diskette (10-Pack) (P/N 6404107)

Note: The 2.0Mb diskette (P/N 6404078) is not supported.

8550 IBM PERSONAL SYSTEM/2(TM) MODEL 50**PURPOSE**

The IBM Personal System/2[®] Model 50 (IBM 8550) introduces advanced design and technology and a new Micro Channel(TM) Architecture to provide significant price/performance enhancements for desktop computing and workstations. The 10M Hz INTEL 80286 microprocessor offers application growth capabilities and is designed to maintain software compatibility with most current IBM personal computer programs. A high level of feature integration on the system board reduces optional adapter requirements. When configured with the new analog displays, the 8550's integrated Video Graphics Array (VGA) provides enhanced performance, increased display functions, and increased color availability. The system includes a 1.44Mb, 3.5-inch diskette drive and a 20Mb fixed disk drive. Besides the new mouse, memory, math co-processor, and diskette drive options, new connectivity options (dual asynchronous, multi-protocol, and modem adapters, and other options) allow the 8550 to communicate with a variety of hosts and networks.

National Language support for the hardware system is provided for the following eleven languages: Danish, Dutch, English UK, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, and Swedish.

In addition, keyboard support is provided on the system reference diskette for the above languages plus Belgian French, Flemish, Swiss-French, and Swiss-German.

The 8550 has a RAM loadable character generator. This allows any code page that utilizes one of the supported text modes to be loaded. The new operating systems will provide this capability.

(Canada Only) The 8550 and new version of IBM DOS provide the capability to load the Canadian/French code page 863 with character set 993 in addition to the languages listed above. <)

* IBM Personal System/2 is a trademark of the IBM Corporation.

MODELS

Model 021: System unit/keyboard; 1Mb of planar memory, one 1.44Mb, 3.5-inch diskette drive, one 20Mb Fixed Disk Drive, one Disk Controller Adapter, a diskette controller, a keyboard port, a serial/asynchronous port, a parallel port, a pointing device port, and a Video Graphics Array (VGA) port that supports new graphics and text modes and yet maintain compatibility with CGA and EGA modes (including 640 x 480 graphics, 320 x 200 graphics in 256 colors, and 720 x 400 text).

Prerequisites: Attachment of one of the following displays or equivalent display:

- An IBM 8512 Color Display Model 001
- An IBM 8503 Monochrome Display Model 001
- An IBM 8513 Color Display Model 001
- An IBM 8514 Color Display Model 001 and the IBM Display Adapter 8514/A (#4054)

IBM Operating System/2 Standard Edition users require Version 1 Release 1. IBM DOS users require DOS Version 3.3.

Customer Setup (CSU): All models and special features of the 8550 are customer setup.

HIGHLIGHTS

The 8550 features the following:

- New Micro Channel Architecture with a 16-bit bus
- Increased processing speed (80286/10M Hz)

- Improved multitasking and communications capabilities
- New level of graphics and text quality
- A 20Mb fixed disk and 1.44Mb, 3.5-inch diskette drive
- High level of feature integration on the system board
- Ease of installation and configuration
- Universal, automatic voltage-sensing power supply

An increased number of national languages are supported.

The following keyboard drivers are included with the system reference diskette:

- Belgium, ID#120
- Canadian/French, ID#058
- Danish, ID#159
- French, ID#189
- German, ID#129
- Italian, ID#141
- Latin American, ID#171
- Netherlands, ID#143
- Norwegian, ID#144
- Portuguese, ID#163
- Spanish, ID#172
- Swedish/Finnish, ID#153
- Swiss, ID#150
- United Kingdom, ID#166
- United States, ID#103

Standard Features:

- 80286 10M Hz Microprocessor
- 1Mb of memory on the system board
- 3.5-inch, 1.44Mb Diskette Drive
- 20Mb (80ms) Fixed Disk Drive
- Fixed Disk Adapter
- Integrated Diskette Controller
- Integrated Serial/Asynchronous Port
- Integrated Parallel Port
- Integrated Video Graphics Array/Port
- Pointing Device Port
- Keyboard Port
- 80287 Math Co-Processor Socket
- Enhanced Keyboard (with cable)
- Four (4) 16-bit I/O slots (with one slot occupied by the disk controller adapter)

DESCRIPTION

The IBM Personal System/2 Model 50 is a desktop, entry-level introduction into IBM's new System/2 family with Micro Channel Architecture.

The system unit features a 10M Hz microprocessor, ROM BASIC and 1Mb of memory on the system board, expandable to 7Mb with memory options. The 8550 comes standard with a 1.44Mb, 3.5-inch diskette drive, a 20Mb fixed disk drive, a disk controller, a keyboard port, a serial/asynchronous port, a parallel port, a pointing device port, and a Video Graphics Array (VGA) port: this port supports new graphics and text modes (including 640 x 480 graphics, 320 x 200 graphics in 256 colors, and 720 x 400 text), and yet maintains compatibility with CGA and EGA modes.

The system has two levels of BIOS that total 128Kb. There is a Compatibility BIOS (CBIOS) with memory addressability of up to one megabyte that provides compatible support for current application programs. An additional version of BIOS, Advanced BIOS (ABIOS), provides support for multitasking operating systems and has extended memory addressability up to 16 megabytes. (However, the physical memory capacity of the 8550 is limited to 7Mb.)

This high level of feature integration on the system board reduces the requirement for optional adapters. In addition, the system is designed for tool-free installation and includes security features in both BIOS/CMOS and an external keylock.

Additional features of the system unit include: four 16-bit I/O slots (with one slot occupied by the disk controller adapter), a 94-watt, automatic voltage-sensing, universal power supply, a time and date clock with battery backup, an additional position for a second 3.5-inch diskette drive, and the IBM Enhanced Personal Computer Keyboard.

The 8550 supports the 8503, 8512, 8513 and 8514 analog displays which together with the new VGA built-in function provide significant enhancements to graphics and text capabilities. The ability to display more colors using larger palettes with enhanced addressability widely expands new application opportunities.

The following features are supported:

- IBM Personal System/2 80287 Math Co-Processor (10M Hz)
- IBM Personal System/2 80286 Memory Expansion Option (0.5Mb/2Mb) for memory expansion up to 7Mb on the 8550 and up to 15Mb on the 8560
- IBM Personal System/2 80286 Memory Expansion Kit (512Kb) with memory modules for the Memory Expansion Option
- IBM Personal System/2 Dual Async Adapter/A supporting two RS-232-C ports
- IBM Personal System/2 Multi-Protocol Adapter/A supporting asynchronous, bisynchronous, HDLC, or SDLC protocols
- IBM Personal System/2 Mouse, a 2-button mechanical pointing device
- IBM Personal System/2 1.44Mb Diskette Drive, providing a second device for 3.5-inch media
- (Canada Only) IBM Personal System/2 300/1200 BPS Internal Modem/A (<)
- IBM 3270 Connection Adapter
- System 36/38 Work Station Emulation Adapter
- IBM Personal System/2 PC Network Adapter II/A
- IBM Personal System/2 PC Network Baseband Adapter/A
- IBM Personal System/2 Token-Ring Network Adapter/A
- Scanner adapters that support the IBM 3117 and 3118 Scanners
- An external diskette drive and adapter that support 5.25-inch/360Kb diskette data transfer and conversion
- A high-function graphics adapter and memory kit, providing 1024 x 768 resolution in 256 colors, for support of the new IBM 8514 Color Display
- An external optical disk drive supporting up to 200Mb in a "write-once-read many" mode
- A data migration accessory for transferring data directly from another IBM Personal Computer

Performance: The 80286 10M Hz 16-bit microprocessor coupled with the new Micro Channel Architecture allows the 8550 to perform approximately 20 percent faster than the IBM Personal Computer XT Model 286.

A Disk Cache program is available on the Reference Diskette (included in the Quick Reference manual), which the user can install with IBM DOS 3.3. This program is designed to provide enhanced disk performance for most applications.

An increased number of national languages are supported.

I/O Devices Supported Include:

- Displays
 - 8503 Monochrome Display Model 001
 - 8514 Color Display Model 001
 - 8513 Color Display Model 001
 - 8512 Color Display Model 001
 - 8503 Monochrome Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
 - 8514 Color Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
 - 8513 Color Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
 - 8512 Color Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
- Printers
 - 3812 Model 1 Page Printer

- 3852 Model 2 Color Jetprinter
- 4201 Model 1 Proprinter
- 4202 Proprinter/XL
- 5201 Model 1 Quietwriter
- 5201 Model 2 Quietwriter 2 APA
- 5202 Quietwriter(R) III
- 5216 Model 2 Wheelprinter
- 5223 Model 1 Wheelprinter E
- 4201 Proprinter II
- 4207 Proprinter/X24
- 4208 Proprinter/XL24

• Plotters

- IBM 6180 Color Plotter
- IBM 6184 Color Plotter
- IBM 6186 Model 1, 2 Color Plotter
- IBM 7372 Color Plotter
- IBM 7374 Color Plotter
- IBM 7375 Model 1, 2 Color Plotter

• Scanners

- 3117 Scanner
- 3118 Scanner

• Tape Drive

- IBM 6157 Streaming Tape Drive

• Other Devices

- 4869 5.25-inch External Diskette Drive
- IBM 3363 Optical Disk Storage Unit (External)
- ROLMphone 244PC (#46900)
- IBM 80286 Expanded Memory Adapter/A (#3920, P/N 1497252)

• Cables

- IBM Serial Adapter Cable (#0217, P/N 6450217)
- IBM Serial Adapter Connector (#0242, P/N 6450242)
- IBM Communications Adapter Cable (#2067, P/N 1502067)
- IBM Printer Cable (#5612, P/N 1525612)
- IBM Token Ring PC Adapter Cable (#3390, P/N 6339098)
- IBM PC Network Baseband Adapter Cable (#1229, P/N 1501229)
- IBM Cabling System PC Network Baseband Cable (#1227, P/N 1501227)

Physical Specifications:

Width: 360mm (14.2 in.)
Depth: 420mm (16.5 in.)
Height: 140mm (5.5 in.)
Weight: 10.4Kg (23 lbs)

Operating Environment:

- Electrical:
 - 90-137V AC; 50 to 60 Hz
 - 180-265V AC; 50 to 60 Hz
- Ambient Air Temperature:
 - System on: 15.6 - 32.2C (60 - 90F)
 - System off: 10 - 43C (50 - 110F)
- Humidity:
 - System on: 8 - 80 percent RH
 - System off: 5 - 80 percent RH

Publications: Standard publications have been significantly reduced in size by incorporating most operator information along with diagnostic and utility programs on the system Quick Reference diskette.

The following publications are included in the ship group for each system unit shipped:

- A Setup Sheet contains wordless instructions for setting up the system unit, keyboard, and display.
- IBM 8550 Quick Reference manual contains an introduction to the computer, option installation instructions, and trouble shooting instructions.
- The Reference Diskette contains a system tutorial, diagnostics, and utilities.
- The Technical Directory is a listing of publications available for purchase.

- 8550 Quick Reference Manual - S68X-2247, P/N 68X2247
- 8550 Setup Sheet - S68X-2246, P/N 68X2246

Additional copies will be available for a fee from Mechanicsburg.

- (Canada Only) > 8550 Quick Reference (Canadian French) - P/N 68X2276 <
- (LAD Only) > 8550 Quick Reference (Spanish) - P/N 75X5193 <

Documentation available for purchase includes:

- Hardware Maintenance Library

These publications provide the information needed to isolate and repair field replaceable units (FRUs). The Hardware Maintenance Reference topics include: product descriptions, diagnostic overviews, and repair information. The Hardware Maintenance Service includes a Reference Diskette containing advanced diagnostics, and its topics include: diagnostic MAPs, parts catalogs, and a symptom-to-FRU index. Wrap plugs are not included and must be purchased separately.

- Hardware Maintenance Service - S68X-2222, P/N 68X2222
- Hardware Maintenance Reference - S68X-2221, P/N 68X2221
- Hardware Maintenance Binder - S229-9605, P/N 1502561
- 300/1200 Modem/A Supplement - S68X-2274, P/N 68X2274
- (Canada Only) > Hardware Maintenance Library (French) - P/N 94X9818 <
- (LAD Only) > Hardware Maintenance Library (Spanish), P/N 95X2524 <

- Technical Manuals

- The Technical Reference manual is intended for use by engineers and programmers who are developing hardware and software for use with the 8550 and 8560 systems.

Major topics include: system bus interface, adapter design, system board components and operation, system board I/O controllers, power supply, keyboard, instruction sets, characters and keystrokes, and compatibility. BIOS listings and interface information are not included.

- The Personal System/2 and Personal Computer BIOS Interface Manual documents the BIOS interface for the IBM Personal System/2 and IBM Personal Computers.

- Feature Technical References:

These publications are intended for use by engineers and programmers who are developing hardware and software for use with the features. Each publication includes a description of the feature, programming considerations, interface information, connector information, and specifications.

- ▲ Technical Reference (System) - S68X-2224, P/N 68X2224
- ▲ Technical Reference (BIOS) - S68X-2260, P/N 68X2260
- ▲ Tech Ref 20Mb Fixed Disk Drive - S68X-2219, P/N 68X2219

- ▲ Tech Ref Fixed Disk Adapter - S68X-2226, P/N 68X2226
- ▲ Tech Ref Multi-Protocol Adapter - S68X-2220, P/N 68X2220
- ▲ Tech Ref 720Kb/1.44Mb Diskette Dr - S68X-2225, P/N 68X2225
- ▲ Tech Ref Dual Async Adapter - S68X-2217, P/N 68X2217
- ▲ Tech Ref Mouse, S68X-2229 - P/N 68X2229
- ▲ Tech Ref Memory Expansion (80286) - S68X-2227, P/N 68X2227
- ▲ Tech Ref Internal Modem/A - S68X-2275, P/N 68X2275
- ▲ Tech Reference Binder - S229-9606, P/N 6280115

- Other Documentation

The installation instructions for options contain the instructions to install the option, a warranty, and where appropriate, basic operational instructions. These publications are shipped with the options.

SLSS is not available for any of the above publications. Purchasable publications are available through IBM, Authorized Dealers, or the "Technical Directory."

SPECIFY (NONE)

SPECIAL FEATURES

IBM Serial Adapter Cable (#0217, P/N 6450217): This is a 10-foot (3 meters) cable with a 9-pin D-shell to connect to the Dual Async Adapter/A and a 25-pin D-shell connector providing all the signals for an EIA RS-232C interface which can connect the serial port to an appropriate serial device.

IBM Serial Adapter Connector (#0242, P/N 6450242): This adapter is a 10-inch cable with a 9-pin D-shell to connect to the Dual Async Adapter/A and a 25-pin D-shell connector providing all the signals for EIA RS-232 interface for connecting the serial port to an appropriate serial device which has its own cable.

IBM Personal System/2 300/1200 Internal Modem/A (#0349, P/N 6450349): The 300/1200 Internal Modem/A provides the capability to transmit data in duplex mode over the Public Switched Telephone Network at 300 or 1200 bits/second and supports the "AT" Command set. The 300/1200 modem is compatible with the Bell 212A and 103 practice (asynchronous only) recommendation for transmitting data over the Public Switched Telephone Network. Compatible IBM modems include: IBM Personal Computer 1200 bps Modem and the IBM 5841 Modem (asynchronous mode only).

A seven-foot communications cable and a diagnostic diskette are supplied with the modem adapter.

This modem provides Canadian Approval for the Terminal Attachment Program (TAP) standard CS-03. Maximum: Three. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

High Speed Adapter/A (#1028) (P/N 65X1900): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of IBM Personal System/2 System Unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS 422-A driver and Receiver. The adapter is designed to the EIQ RS-422-A electrical interface and provides one 25-pin "D" shell, mail type connector. Maximum: One. Cable: Serial Adapter Cable (P/N 6450217) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter/A. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes. Limitations: The High Speed Adapter/A must be installed in the IBM Personal System/2 System Unit.

Publications: Guide To Operations (P/N 65X1902)

Specify	Form #	Language
#1033	GK2T-0951	English US
#1034	GK10-0003	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 High Speed Adapter/A are:

IBM High Speed Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
65X1902	GK2T-0951	English US
65X1924	GK10-0003	Spanish

IBM High Speed Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
65X0824	SK2T-0953	English US
94X2387	SY12-8508	German
94X2376	SY11-1030	French

IBM High Speed Adapter/A Technical Reference (TR)

P/N	Form #	Language
65X0825	SC18-2155	English US

3117 Adapter/A (#1029)(P/N 65X1920): Allows connection of the 3117 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of the IBM Personal System/2 System Unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005, P/N 6456807) is required. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes.

Publication: Guide To Operation (P/N 65X1922)

Specify	Form #	Language
#1031	GK2T-0950	English US
#1032	GK10-0001	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 3117 Adapter/A are:

IBM 3117 Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
65X1922	GK2T-0950	English US
65X1951	GK10-0001	Spanish

IBM 3117 Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
65X0823	SC18-2153	English US

IBM3117 Adapter/A Technical Reference (TR)

P/N	Form #	Language
65X0823	SC18-2153	English US

(Except LAD>IBM PC Network Adapter II/A (#1222, P/N 1501222): The IBM PC Network Adapter II/A is a feature card specifically designed for connecting the new IBM Personal System/2 Model 50, Model 60, and Model 80 computers to the broadband IBM PC Network. It is compatible with the form factor and bus design of these

new PCs to take advantage of greater Intel 80286 and 80386 processing speeds.

This new adapter features a 2 megabit-per-second transmission speed with CSMA/CD access protocol. It supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II /A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

The IBM LAN Support Program allows this adapter to run with applications written for either the NETBIOS or APPC/PC interfaces.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <) (Except LAD>IBM PC Network Adapter II /A supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD>A feature card for IBM Personal System/2 Model 50.
- A feature card for IBM Personal System/2 Model 60.
- A feature card for IBM Personal System/2 Model 80.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL) only on new systems shipped without a hardfile. <)
- (Except LAD>National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD>Specified Operating Environment

- Machine requirements:

IBM PC Network Adapter II /A requires a full size adapter slot in one of the following system units:

IBM Personal System/2 Model 50
IBM Personal System/2 Model 60
IBM Personal System/2 Model 80

- Programming requirements:

IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher. <)

(Except LAD>IBM PC Network Baseband Adapter/A (#1223, P/N 1501223): IBM PC Network Baseband Adapter/A is a feature card specifically designed for connecting IBM Personal System/2 Model 50, Model 60, and Model 80 computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds. It is not designed to operate in the IBM Personal System/2 Model 30.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter/A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter/A supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to 8 workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of work-

stations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to 10 daisy chains with 8 workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <) (Except LAD> IBM PC Network Baseband Adapter /A supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for IBM Personal System/2 Model 50
- A feature card for IBM Personal System/2 Model 60
- A feature card for IBM Personal System/2 Model 80
- Modular baseband transceiver for connection to the baseband IBM PC Network
- Supports 802.2/LLC protocols
- Supports Remote Initial Program Load (RIPL) on the new systems shipped without hardfiles <)
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment:

- Machine requirements:

IBM PC Network Baseband Adapter/A requires a full size adapter slot in one of the following system units:

IBM Personal System/2 Model 50
IBM Personal System/2 Model 60
IBM Personal System/2 Model 80

- Programming requirements:

IBM LAN Support Program (P/N 83X7873)
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher <)

IBM 3270 Connection (#2000, P/N 83X9702): Adapter card necessary for 3278/79 emulation. It provides 3270 Display Station emulation for the 8550, 8560 and 8580 (models 041 and 071 only) system units. This feature will fit in either the floor or desk top model. Diagnostics are provided with the card. Prerequisites: None. Customer Setup (CSU): Yes.

Highlights:

- Attachment of the 8550, 8560, 8580 (models 041 and 071 only) system units to the following:
 - IBM 3174 Control Unit
 - IBM 3274 Control Unit
 - IBM 4321 Processor Display/Printer Adapter
 - IBM 4331 Processor Display/Printer Adapter
 - IBM 4361 Processor Display/Printer Adapter
 - IBM 4702 Finance Communication Processor
 - IBM 3276 Control Unit
 - IBM 9370 Workstation Subsystem Controller
- Supports emulation of IBM 3278 Display Station Model 2 and IBM 3279 Color Display Station Model 2A or S2A, with certain restrictions.
- Supports both CUT and DFT modes of operation. (Supports DFT mode only on controllers that have the DFT feature installed).
- Supports CUT mode only when attached to a 9370 Workstation Subsystem Controller.
- Can be installed by the customer.
- No host hardware or host system software modifications required for 3270 emulated functions.
- Attachment of the IBM 3274, 3174 or 9370 Workstation Subsystem Controller via the IBM 3299 terminal multiplexer is supported.

Standard Features: The IBM 3270 Connection, IBM 3270 Quick Reference Manual and Diagnostic Diskette.

Description:

THE IBM 3270 Connection is a circuit card that plugs into a slot of the 8550, 8560 and 8580 (models 41 and 071 only) system. A cable receptacle mounted on the card provides for attachment of a customer supplied coaxial cable, IBM cabling system media (3174, 3274 or 9370 Workstation Subsystem Controller attachment only) or telephone twisted pair via IBM/ROLM coax to twisted pair adapter at the rear of the system unit. Most, but not all of the emulated displays are supported.

Specify:

Support for the adapter is provided by IBM Personal Computer 3270 Emulation Programs which provide host communication support via 3270 Display Station Emulation.

The 3270-PC file transfer program (5664-281 for VM/SP with or without HPO, 5665-311 for MVS/TSO, VSE/SP 2.1.2, 1.2 or SSX/VSE 1.4.1 or IBM equivalent is required for file transfer.

Physical Specifications of Hardware:

- Width: 8 inches
- Depth: Less than 1 inch
- Height: 4 inches
- Weight: Less than 1 pound

Operating Environment:

The specific operating environment of the 3270 Connection feature is the same as the System Unit in which it is installed.

Publications:

- IBM 3270 Connection Technical Reference, GA23-0339, P/N 83X9705, #2002
- IBM 3270 Connection Quick Reference, G126-0190, P/N 83X9717, #2001

IBM Communications Adapter Cable (#2067 P/N 1502067): The Communications Adapter Cable feature supports the attachment of a modem to the Multi-Protocol Adapter/A or the system unit serial port connector at the rear of the 8550. The cable is double-shielded and approximately 10 feet (3 meters) long. This cable is required to connect a Multi-Protocol Adapter/A to an external modem or other data communications equipment.

IBM Personal System/2 80287 Math Co-Processor (#3001, P/N 6450356): The 10M Hz 80287 Math Co-Processor provides additional processing power and performance for application programs requiring many or repetitive arithmetic calculations. The 80287 conforms to the ANSI/IEEE floating-point standard. This option is installed in the math co-processor socket on the system board and does not require an expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 80286 Memory Expansion Option (#3006, P/N 6450344): The 80286 Memory Expansion Option provides 512Kb of memory standard. Up to three 80286 Memory Expansion Kits (#3012, P/N 6450345), with 512Kb each, can be added to the expansion option to provide a total of 2Mb of memory for each card.

Up to three fully-populated Memory Expansion Options can be installed in the 8550 to provide 6Mb of memory on the system in addition to the 1Mb standard on the system board. No switch setting is required.

This option requires an expansion slot. Maximum: Three for the 8550. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 80286 Memory Expansion Kit (#3012, P/N 6450345): The 80286 Memory Expansion Kit provides 512Kb of memory and can only be installed on the 80286 Memory Expansion Option (#3006, P/N 6450344). No switch setting is required. Maximum: Three per Memory Expansion Option. Field Installation: Yes. Customer Setup: Yes. Prerequisite: #3006.

IBM Personal System/2 Dual Async Adapter/A (#3033, P/N 6450347): This option provides asynchronous communications on two independent RS-232-C ports. The option is programmable and

supports communications speeds from 50 bps to 19.2K bps. This adapter supports signal transmission across distances of up to 50 feet.

A maximum of three Dual Async Adapters can be physically attached providing a total of seven serial ports (one on the system board plus two per adapter). Total system load will limit the practical number of ports and the speed of each port. Maximum: Three. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 Multi-Protocol Adapter/A (#3042, P/N 6450348): This option provides a full-duplex or half-duplex multi-protocol serial data transmission channel. It supports asynchronous, bisynchronous, HDLC, or SDLC protocols. It will support modems or direct attachment. The option is programmable at speeds from 50 bps to 19.2K bps and it supports automatic protocol switching via software at setup. Maximum: Two. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 1.44Mb Diskette Drive (#3057, P/N 6450353): This feature is a double-sided, 3.5-inch diskette drive that supports 3.5-inch media providing 1.44Mb of storage capacity. The drive uses the diskette controller on the system planar board and does not require an expansion slot. When installed, it becomes the "B" drive.

The drive will operate in two modes: low density and high density. In low density mode, the drive is compatible with the 720Kb (3.5-inch) diskette drive. In high density mode, it doubles the data capacity to 1.44Mb and the data rate to 500K bps.

Technical Data:

- Size
 - Height: 41mm (1.6 in.)
 - Width: 102mm (4.0 in.)
 - Depth: 150mm (5.9 in.)
 - Weight: 0.68kg (1.5 lbs)
- Media:
 - 3.5-inch ANSI compatible
 - Media Capacity (2Mb) - high density mode
 - ▲ Unformatted
 - 2Mb (1Mb per side)
 - 12.5Kb per track
 - ▲ Formatted
 - 1.44Mb (720Kb per side)
 - 9Kb per track
- Track Density: 135 tracks per inch
- Tracks: 80
- Number of Heads: 2
- Transfer Rate: 500,000 bps (MFM) - high density mode
- Access Time:
 - Track-to-Track: 6ms
 - Seek Settle Time: 15ms
 - Motor Start Time: 500ms (maximum)
- Disk Speed: 300 rpm +/- 1.5 percent

Limitation: The 1.44Mb Diskette Drive can format, read, and write either 1Mb or 2Mb diskettes. The 1.44Mb Diskette Drive should NOT be used to format a 1Mb diskette as 1.4 4Mb or format a 2Mb diskette as 720Kb. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 80286 Expanded Memory Adapter/A (#3920, P/N 1497252): Provides 2Mb of expanded memory function for the IBM Personal System/2 Models 50 and 60. It also supports the device drivers resident within the IBM 3270 Workstation Program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces.

The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICROSOFT.

The IBM Personal System/2 80286 Expanded Memory Adapter/A extends the memory of IBM Personal System/2 Models 50 AND 60 up to 2 million bytes of memory when using the IBM 3270 Workstation Program Versions 1.0 or 1.1. Users may run up to six PC

DOS sessions and/or up to four host sessions concurrently. PC DOS applications written to the Expanded Memory Specification and/or requiring virtual disk are also supported by the IBM 3270 Workstation Program when utilizing the IBM Personal System/2 80286 Expanded Memory Adapter/A.

The IBM Personal System/2 80286 Expanded Memory Adapter/A on the 8550 and 8560 extends the memory to 3 million bytes of memory when using IBM Operating System/2 (Standard and Extended Edition). Multiple IBM Personal System/2 80286 Expanded Memory Adapter/A features may be installed to extend the system memory when running IBM Operating System/2 (Standard and Extended Edition). Customer Setup: Yes. Limitations: One per 8550 and 8560 when using the IBM 3270 Workstation Program. Field Installation: Yes. Cable Order: None.

IBM Personal System/2 Display Adapter 8514/A (#4054, P/N 1887972): This adapter provides support for advanced interactive text, image and graphics applications. The following new display modes are supported:

- 640 X 480 pels in 16 colors
- 1024 X 768 pels in 16 colors

When configured with the IBM 8514 Color Display, it is suited for applications that require advanced function, high performance and large screen content (1024 X 768 format). It also supports the 8503 Monochrome Display as well as the 8512 and 8513 Color Displays. A Memory Expansion Kit (#4081, P/N #1887989) can be attached to provide enhanced color capabilities.

The IBM Personal System/2 Display Adapter 8514/A provides support for attachment of one of the following displays: 8503, 8512, 8513 and 8514. Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 8514 Memory Expansion Kit (#4081, P/N 1887989): This Memory Expansion Kit provides 512Kb of additional memory for the IBM Display Adapter 8514/A (#4054, P/N 1887972) to provide enhanced color capability. When configured with an IBM 8514 Color Display, this additional memory increases the number of colors supported to 256 and gray scales to 64 while utilizing the 1024 X 768 mode. Maximum: One. Field Installation: Yes. Prerequisite: IBM Display Adapter 8514/A. Customer Setup: Yes.

6157 Streaming Tape Drive Adapter (#4160, P/N 92X1458): Provides for attachment of the IBM 6157 Streaming Tape Drive to IBM Personal System/2 Models 50, 60, and 80 family of processors. The 6157 allows fast, convenient save/restore and interchange capabilities on 1/4-inch magnetic tape cartridges when used in conjunction with the SY-TOS/IBM Tape Utilities.

- Allows fast and convenient data save/restore
- Permits data interchange using 1/4-inch magnetic tape cartridges

Maximum: Only one adapter can be attached per IBM Personal System/2 Models 50, 60, and 80 system. Prerequisites: IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 1.1 licensed program (P/N 75X1147). Customer Setup (CSU): Yes.

Operating Environment

- Machine Requirements
 - Any model of IBM Personal System/2 Models 50, 60, and 80 and the IBM 6157 Streaming Tape Drive.
- Programming Requirements
 - IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 2.0 licensed program (75X1147).

IBM Token-Ring Network Adapter/A (#4790, P/N 69X8138): IBM Token-Ring Network attachment for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041. 071 is available through this option. The adapter transmits and receives at a speed of four million bpi using protocols conforming to IEEE 802.5 and ECMA 89

standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard. The adapter is compatible with International Standard ISO - 8802/5. The adapter provides 16K bytes of Random Access Memory (RAM) for increased message segment size and/or increasing the number of link stations supported by the adapter.

The IBM Token-Ring Network Adapter/A is a feature card for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 systems. The adapter contains a microprocessor operating under control of adapter resident microcode. This adapter requires one slot.

A diskette is included with the adapter which contains an adapter description file, adapter diagnostic and a single ring network diagnostic. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as an aid in network problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented. The IBM Token-Ring Network Problem Determination Guide (form number SX27-3710) should be obtained for instructions on how to use the ring diagnostic.

An Installation and Testing Instructions document is included with the adapter to assist the customer with the adapter set up.

Prerequisites: A customer supplied attachment cable is required for connecting the adapter to the network cabling system. The IBM Token-Ring Network PC Adapter Cable (#3390, P/N 6339098) for the IBM Cabling System available from IBM or the Type 3 Media Filter for the IBM Type 3 cable available from Authorized Referenced IBM Distributors. **Customer Setup (CSU):** Yes.

Highlights:

- Transmits and Receives at 4 million bit per second
- Provides 16Kb of Random Access Memory (RAM)
- Designed specifically for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 new advanced I/O channel to take advantage of the greater 80286 and 80386 processing speeds.
- Provides for Remote Program Load (RPL) as an optional feature

Publications:

- P/N 83X9112 - IBM Token-Ring Network Hardware Maintenance Reference and Service
- P/N 6466690 - IBM Token-Ring Network PC Technical Reference - Chapter 9
- IBM Token-Ring Network Adapter/A
 - P/N 69X8138 - English US
 - P/N 83X7490 - France
 - P/N 83X7498 - Germany
 - P/N 83X7502 - Italy
 - P/N 83X7510 - Norway

System 36/38 Emulation for the IBM Personal System/2 /A Installation Convenience Kit Version 1.0 (#6287, P/N 69X6287): This option provides IBM System/36 and IBM System/38 Terminal Emulation as a 3196 Display attached via the normal twinaxial interface and supports four display sessions, file transfer and concurrent operation. Host Printer Emulation and Host Graphics Emulation are also supported.

This option includes the IBM System 36/38 Work Station Adapter, IBM System 36/38 Work Station Emulation Program, IBM System 36/38 Work Station Emulation Attachment Cable, Diagnostic Diskette, Quick Reference Manual and Software User's Guide.

IBM System 36/38 Work Station Emulation Adapter/A (#6279) and Attachment Cable (#6293): The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable offer a new IBM Personal System/2 emulation product for twinax attachment to the System/36 and System/38 as a work station. These products offer enhanced

functions beyond that established by the IBM Enhanced 5250 Emulation Product.

The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable allows specified IBM Personal System/2 models to emulate either 3196 or 5292-2 work station displays or 5256, 5219, 5224, or 5225 printers. The adapter is attached to the twinax cable used in System 36/38 environments. In combination with the IBM System 36/38 Work Station Emulation, Version 1.1.0, this adapter allows the user to access the application programs on the System 36/38 as if he were at a 3196 or 5292-2 work station. As a printer, the user can print the output of System 36/38 application programs on a printer attached to the IBM Personal System/2. The IBM System 36/38 Work Station Emulation Program provides limited multi-tasking capabilities which allows the IBM Personal System/2 to interact with the System 36/38 as if it were four separate terminals or printers. That is, the user can easily switch between up to four different System 36/38 tasks as well as one DOS task.

The following models of the IBM Personal System/2 are supported:

- 8550-021
- 8560-041
- 8560-071
- 8580-041
- 8580-071
- 8580-111

Specify:

Support for the adapter is provided by IBM System 36/38 Work Station Emulation Programs which provide host communication support via 5250 emulation. **Prerequisites:** None. **Customer Setup (CSU):** Yes.

Highlights:

- Four Work Station Sessions

The IBM System 36/38 Work Station Emulation program allows the user to establish one to four sessions with a System/36 or System/38. The sessions can be any combination of printer, display, or host graphics sessions that does not exceed four sessions total.

- On Card 8088 Processor

The on card 8088 processor reduces the timing dependencies on the PC processor.

Standard Features: The IBM System 36/38 Work Station Emulation Adapter/A, IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable.

Physical Specifications of Hardware:

Width - 11.5 inches
Depth - Less than 1 inch
Height - 3.5 inches
Weight - Less than 1 pound

Operation Environment: The specific operating environment of the IBM System 36/38 Work Station Emulation Adapter/A is the same as the system unit in which it is installed.

Product Numbers:

- IBM System 36/38 Work Station Emulation Installation Convenience Kit/A, Version 1.0
 - (APG Only > English US, P/N 69X6287
 - Uppercase English, P/N 59X3285 <)
 - (LAD Only > English US, P/N 69X6287
 - Latin American Spanish, P/N 59X3243 <)
 - (Canada Only > English US, P/N 69X6287
 - French Canadian, P/N 59X3276 <)

Maximum: One. **Field Installation:** Yes. **Prerequisite:** An available expansion slot.

IBM Personal System/2 5.25-inch External Diskette Drive Adapter/A (#8760, P/N 6450245): This feature allows the IBM 4869 5.25-inch External Diskette Drive (360Kb) to be connected to the IBM 8550.

The option consists of an adapter card, an internal cable assembly, and a feature card. The adapter card plugs into the connector for the 3.5-inch B drive. When installed, it becomes the B drive. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available expansion slot and an open B drive position.

IBM Personal System/2 Mouse (#8770, P/N #6450350): The 2-button mechanical Mouse is available for applications that operate more efficiently using a pointing-type device. The Mouse attaches into the system pointing device port and requires no additional hardware features or external power. A device driver is included with the Mouse, and should be used with supporting applications.

The IBM Mouse is ergonomically designed to fit in one's hand and uses mechanical motion detection to indicate the "x" and "y" movement to the system. Two push-button switches transmit their states directly to the system. The IBM Mouse is connected to the system with a thin, 9-foot long shielded, 4-conductor cable. The connector has a special overmolding for ease of connection to the system pointing device port on the 8550. Maximum: One. Field Installation: Yes. Prerequisite: System pointing device port. Customer Setup: Yes.

IBM Token-Ring Network Adapter/A - Remote Program Load (#8881, P/N 83X8881): IBM Token-Ring Network Adapter/A - Remote Program Load (RPL) is an EPROM designed to be plugged into an available socket on the IBM Token-Ring Network Adapter/A (#4790) card. It is required for each of the devices on the network which are to be loaded from a loading device. The RPL feature will automatically issue a request to be loaded any time the device is reset and if the device has no system disk available. (Example: Power-on, CTRL-ALT-DEL). The loading device program is the responsibility of the user and is not provided with this feature.

Each RPL Feature Kit contains one 8K EPROM module with micro code, a 3-1/2 inch diskette containing a sample program for the loading device, and a publication. The publication contains the following: Introduction, Installing the Remote Program Load module, and Programming Requirements.

Specified Operating Environment:

- Machine requirements:
 - 8550 Model 021
 - 8560 Model 041, 071
 - 8580 Model 041, 071
- Program Requirements:
 - IBM Local Area Network Support Program - P/N 83X7873

MODEL CONVERSIONS (NONE)

ACCESSORIES

IBM Personal System/2 Data Migration Facility (#5003, P/N 1501224): The Data Migration Facility is a connecting tool for trans-

ferring customer files from an IBM Personal Computer system to an IBM 8550 system. It provides data and program transfer capability from IBM 5.25-inch Personal Computer systems to the IBM 8550's fixed disk drive or 3.5-inch media.

It operates via a standard IBM printer cable on an IBM 5150, 5155, 5160, 5162, or 5170 system and the parallel port on the IBM 8550.

The Data Migration Facility includes a 5.25-inch diskette with a "send" program, the connector itself, and the appropriate instructions for use. A "receive" program, also required, is included on the Reference Diskette packaged with each new system.

IBM DOS 2.0 or later is required on the sending system and IBM DOS 3.3 is required on the receiving system. An IBM Personal Computer Printer Cable (P/N 1525612) must be attached to one of the following adapters on the host IBM Personal Computer system.

Parallel Adapter (#5200, P/N 1505200)
Monochrome/Printer Adapter (#4900, P/N 1504900)
Serial/Parallel Adapter (#0215, P/N 6450215)

Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: IBM Cable P/N 1525612 and IBM DOS 2.0 or higher (sending system) and DOS 3.3 (receiving system)

Copying Licensed Programs:

- IBM grants the user permission to copy IBM Licensed Programs, using the Data Migration Facility, to a new medium. No additional rights are granted to the user beyond those stated in the user's original IBM Program License Agreement. Therefore, use of an IBM program remains restricted to one machine at a time unless otherwise stated by IBM.
- For non-IBM programs, the user should consult the applicable license agreement that governs its use or contact the program supplier to determine restrictions on copying.

Since some programs are "copy protected" or may restrict the number of copies, the user has the responsibility to assure the copied program functions before erasing other copies of the program.

(Canada Only > Accessories can be ordered through the National Distribution Division (NDD), Dayton, NJ, using the appropriate part numbers, or by calling IBM Direct on 1-800-426-2468. <)

MACHINE ELEMENTS (NONE)

SUPPLIES

3.5-inch, 2.0Mb Diskettes (P/N 6404078)

8560 PERSONAL SYSTEM/2 MODEL 60

PURPOSE

The IBM Personal System/2* Model 60 (IBM 8560) introduces advanced design and technology and Micro Channel(TM) Architecture to enhance the price/performance of computing for business environments. The 10M Hz 80286 microprocessor offers application growth capabilities and is designed to maintain software compatibility with most current IBM personal computer programs. A high level of feature integration on the system board reduces optional adapter requirements. When configured with the analog displays, the 8560's integrated Video Graphics Array (VGA) provides enhanced performance, increased display functions, and increased color availability. The system includes a 1.44MB, 3.5-inch diskette drive and a 44MB fixed disk (8560-041) or 70MB fixed disk drive (8560-071). Two new fixed disk drive options are also announced for the 8560 and 8580: a 44MB fixed disk drive (8560-041/8580-041) and a 70MB fixed disk drive (8560-071/8580-071). A wide range of connectivity options allow the 8560 to communicate with a variety of hosts and networks.

* IBM Personal System/2 is a trademark of the IBM Corporation.

National Language support for the hardware system is provided for the following eleven languages:

Danish	Italian
Dutch	Norwegian
English (UK)	Portuguese
Finnish	Spanish
French	Swedish
German	

In addition, keyboard support is provided on the system reference diskette for the above languages plus Belgian French, Flemish, Swiss-French, and Swiss-German.

The 8560 has a RAM loadable character generator. This allows any code page that utilizes one of the supported text modes to be loaded.

(Canada only) The 8560 and the new version of IBM DOS will provide the capability to load the Canadian French code page 863 with character set 993 in addition to the languages listed above. <)

MODELS

8560-041: System unit/keyboard, 1MB of system board memory, one 1.44MB, 3.5-inch diskette drive, one 44MB Fixed Disk Drive, one Disk Controller Adapter, a diskette controller, a keyboard port, a serial/asynchronous port, a parallel port, a pointing device port, and a Video Graphics Array (VGA) port that supports new graphics and text modes (including 640 x 480 graphics; 320 x 200 graphics in 256 colors; 720 x 400 text) and compatibility with CGA and EGA.

8560-071: System unit/keyboard, 1MB of system board memory, one 1.44MB, 3.5-inch diskette drive, one 70MB Fixed Disk Drive, one Disk Controller Adapter, a diskette controller, a keyboard port, a serial/asynchronous port, a parallel port, a pointing device port, and a Video Graphics Array (VGA) port that supports new graphics and text modes (including 640 x 480 graphics; 320 x 200 graphics in 256 colors; 720 x 400 text) and compatibility with CGA and EGA.

Prerequisites: Attachment of one of the following displays or equivalent display:

- 8512 Color Display Model 001
- 8503 Monochrome Display Model 001
- 8513 Color Display Model 001
- 8514 Color Display Model 001 and the IBM Display Adapter 8514/A (#4054)

IBM Operating System/2 Standard Edition users require Version 1 Release 1. IBM DOS users require DOS Version 3.3.

Customer Setup (CSU): All models and special features of the 8560 are customer setup.

HIGHLIGHTS

The 8560 features the following:

- New Micro Channel(TM) Architecture with a 16-bit bus
- Increased processing speed (80286/10M Hz)
- Improved multi-tasking and communications capabilities
- New level of graphics and text quality
- Large capacity 44MB or 70MB fixed disk and 1.44MB, 3.5-inch diskette drive
- High level of feature integration on the system board
- Ease of installation and configuration
- Universal, automatic voltage-sensing power supply

An increased number of national languages are supported.

I/O Devices Supported

- Displays
 - 8503 Monochrome Display, Model 001
 - 8514 Color Display, Model 001
 - 8513 Color Display, Model 001
 - 8512 Color Display, Model 001
- Printers
 - 3812 Model 1 Page Printer
 - 3852 2 Color Jetprinter
 - 4201 Proprinter II
 - 4201 Model 1 Proprinter
 - 4202 Proprinter/XL
 - 4207 Proprinter/X24
 - 4208 Proprinter/XL24
 - 5201 Model 1 Quietwriter
 - 5201 Model 2 Quietwriter 2 APA
 - 5202 Quietwriter(R) III
 - 5216 Model 2 Wheelprinter
 - 5223 Model 1 Wheelprinter E
- Plotters
 - 6180 Color Plotter
 - 6184 Color Plotter
 - 6186 Model 1, 2 Color Plotter
 - 7372 Color Plotter
 - 7374 Color Plotter
 - 7375 Model 1, 2 Color Plotter
- Scanners
 - 3117 Scanner
 - 3118 Scanner
- Tape Drive
 - 6157 Streaming Tape Drive
- Other Devices
 - 4869 5.25-inch External Diskette Drive
 - 3363 Optical Disk Storage Unit (External)
 - ROLMphone 244PC (#46900)
 - IBM 80286 Expanded Memory Adapter/A (#3920, P/N 1497252)
- Cables
 - IBM Serial Adapter Cable (#0217, P/N 6450217)
 - IBM Serial Adapter Connector (#0242, P/N 6450242)
 - IBM Communications Adapter Cable (#2067, P/N 1502067)
 - IBM Printer Cable (#5612, P/N 1525612)
 - IBM Token Ring PC Adapter Cable (#3390, P/N 6339098)

- IBM PC Network Baseband Adapter Cable (#1229, P/N 1501229)
- IBM Cabling System PC Network Baseband Cable (#1227, P/N 1501227)

Standard Features

The following features are standard on the 8560:

- 80286 10M Hz Microprocessor
- 1MB of memory on the system board
- 44MB Fixed Disk Drive (8560-041) with 40ms average access time or 70MB Fixed Disk Drive (8560-071) with 30ms average access time (weighted)
- Fixed Disk Controller Adapter (ST506 interface for 8560-041; ESDI interface for 8560-071; occupies one expansion slot)
- Integrated Diskette Controller
- Integrated Serial/Asynchronous Port
- Integrated Parallel Port
- Integrated Video Graphics Array/Port
- Pointing Device Port
- Keyboard Port
- 80287 Math Co-Processor Socket
- Enhanced Keyboard (with cable)
- Eight 16-bit I/O slots (with one slot occupied by the disk controller adapter)

DESCRIPTION

The Personal System/2 Model 60 is a mid-range, desk-side member of IBM's System/2 family with MICRO CHANNEL(TM) ARCHITECTURE.

The system unit features a 10M Hz 80286 microprocessor, ROM BASIC, and 1MB of memory on the system board, expandable to 15MB with memory options. The 8560 comes standard with a 1.44MB, 3.5-inch diskette drive, either a 44MB or 70MB fixed disk drive, a disk controller, a keyboard port, a serial/asynchronous port, a parallel port, a pointing device port, and a Video Graphics Array (VGA) port: this port supports graphics and text modes (including 640 x 480 graphics, 320 x 200 graphics in 256 colors, and 720 x 400 text), and yet maintains compatibility with CGA and EGA.

The system has two levels of BIOS that total 128KB. There is a Compatibility BIOS (CBIOS) with memory addressability of up to 1MB that provides compatible support for current application programs. An additional version of BIOS, Advanced BIOS (ABIOS), provides support for multi-tasking operating systems and has extended memory addressability up to 16MB. However, the physical memory capacity of the 8560 is limited to 15MB.

This high level of feature integration on the system board reduces the requirement for optional adapters. In addition, the system is designed for tool-free installation and includes security features in both BIOS/CMOS and an external keylock.

Additional features of the system unit include: eight 16-bit I/O slots (with one slot occupied by the disk controller adapter), an automatic voltage-sensing, universal power supply, a time and date clock with battery backup, additional positions for a second 5.25-inch disk drive and for a second 3.5-inch diskette drive, and the IBM Enhanced Personal Computer Keyboard.

The 8560 supports the 8503, 8512, 8513, and 8514 analog displays which together with the new VGA built-in function provide significant enhancements to graphics and text capabilities. The ability to display more colors using larger palettes with enhanced addressability widely expands new application opportunities.

The following new features are also announced to provide additional capabilities. These features are also supported on the 8580.

- An IBM Personal System/2 44MB Fixed Disk Drive, providing a second disk drive
- An IBM Personal System/2 70MB Fixed Disk Drive, providing a second disk drive

Besides these features, the 8560 also supports the 8550 features.

Performance: The 80286 10M Hz 16-bit microprocessor coupled with the Micro Channel Architecture allows the 8560 to perform approximately 20 percent faster than the IBM Personal Computer AT.

A Disk Cache program is available on the Reference Diskette (included in the Quick Reference manual), which the user can install with IBM DOS 3.3. This program is designed to provide enhanced disk performance for most applications.

An increased number of national languages are supported.

Physical Specifications:

Width: 166mm (6.5 inches)
318mm (12.5 inches) with feet extended
Depth: 482mm (19.0 inches)
Height: 597mm (23.5 inches)
Weight: 21.3Kg (47 pounds)

Operating Environment:

Electrical:
90 - 137V AC, 50/60 Hz
180 - 265V AC, 50/60 Hz
Ambient Air Temperature:
System on: 15.6 - 32.2 degrees C (60 - 90 degrees F)
System off: 10 - 43 degrees C (50 - 110 degrees F)
Humidity:
System on: 8 - 80 percent Relative Humidity
System off: 20 - 80 percent Relative Humidity

Publications: Standard publications have been significantly reduced in size by incorporating most operator information along with diagnostic and utility programs on the system Quick Reference diskette.

The following publications are included in the ship group for each system unit shipped:

- A Setup Sheet contains wordless instructions for setting up the system unit, keyboard, and display.
- 8560 Quick Reference manual contains an introduction to the computer, option installation instructions, and troubleshooting instructions.
- The Reference Diskette contains a system tutorial, diagnostics, and utilities.
- The Technical Directory is a listing of publications available for purchase.

Document Name	Order Number	P/N
"8560 Quick Reference Manual"	S68X-2213	68X2213
"8560 Setup Sheet"	S68X-2209	68X2209

Additional copies are available for a fee from Mechanicsburg.

(Except LAD> Document Name	P/N
"8560 Quick Reference Manual (Canadian French)"	68X2277 68X2277<

(LAD only> Document Name	P/N
"8560 Quick Reference Manual (Spanish)"	75X5213<

Documentation available for purchase includes:

- Hardware Maintenance Library

MACHINES

These publications provide the information needed to isolate and repair field replaceable units (FRUs). The Hardware Maintenance Reference topics include: product descriptions diagnostic overviews, and repair information. The Hardware Maintenance Service includes a Reference Diskette containing advanced diagnostics, and its topics include; diagnostic MAPs, parts catalogs, and a symptom-to-FRU index. Wrap plugs are not included and must be purchased separately.

Document Name	Order Number	P/N
"Hardware Maintenance Service"	S68X-2222	68X2222
"Hardware Maintenance Reference"	S68X-2221	68X2221
"Hardware Maintenance Binder"	S229-9605	1502561

Additional copies are available for a fee from Mechanicsburg.

(Canada only) Document Name	P/N
"Hardware Maintenance Library (French)"	94X9818<)
(LAD only) Publication Name	P/N
"Hardware Maintenance Library (Spanish)"	95X2524<)

• Technical Reference Manuals

- The Technical Reference manual is intended for use by engineers and programmers who are developing hardware and software for use with the 8550 and 8560 systems.

Major topics include: system bus interface, adapter design, system board components and operation, system board I/O controllers, power supply, keyboard, instruction sets, characters and keystrokes, and compatibility. BIOS listings and interface information are not included.

- The "Personal System/2 and Personal Computer BIOS Interface" manual documents the BIOS interface for the Personal System/2 and IBM Personal Computers.

- Feature Technical References:

These publications are intended for use by engineers and programmers who are developing hardware and software for use with the features. Each publication includes a description of the feature, programming considerations, interface information, connector information, and specifications and may be purchased separately.

"Technical Reference (System)", S68X-2224, P/N 68X2224

"Technical Reference (BIOS)", S68X-2260, P/N 68X2260

"Tech Ref 44MB Fixed Disk", S68X-2233, P/N 68X2233

"Tech Ref 70MB Fixed Disk", S68X-2235, P/N 68X2235

"Tech Ref ESDI Adapter/A", S68X-2234, P/N 68X2234

"Technical Reference Binder", S229-9606, P/N 6280115

• Other Publications

The installation instructions for options contain the instructions to install the option, a warranty, and where appropriate, basic operational instructions. These publications are shipped with the options.

SLSS is not available for any of the above publications. Purchasable publications are available through IBM, Authorized Dealers, or the "Technical Directory".

SPECIFY (NONE)

SPECIAL FEATURES

IBM Serial Adapter Cable (#0217, P/N 6450217): This is a 3m (10 ft) cable with a 9-pin D-shell to connect to the Dual Async Adapter/A and a 25-pin D-shell connector providing all the signals of an EIA RS-232-C interface which can connect the serial port to an appropriate serial device.

IBM Serial Adapter Connector (#0242, P/N 6450242): This adapter is a 10-inch cable with a 9-pin D-shell to connect to the Dual Async Adapter/A and a 25-pin D-shell connector providing all the signals for an EIA RS-232 interface for connecting the serial port to an appropriate serial device which has its own cable.

300/1200 Internal Modem/A (#0349, P/N 6450349): The 300/1200 Internal Modem/A provides the capability to transmit data in duplex mode over the Public Switched Telephone Network at 300 or 1200 bps and supports the "AT" Command set. The 300/1200 modem is compatible with the Bell 212A and 103 practice (asynchronous only) recommendation for transmitting data over the Public Switched Telephone Network. Compatible IBM modems include: IBM Personal Computer 1200 bps Modem and the 5841 Modem (asynchronous mode only).

A seven-foot communications cable and a diagnostic diskette are supplied with the modem adapter.

This modem provides Canadian approval for the Terminal Attachment Program (TAP) standard CS-03. Maximum: Seven. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

High Speed Adapter/A (#1028) (P/N 65X1900): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of IBM Personal System/2 System Unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS 422-A driver and Receiver. The adapter is designed to the EIQ RS-422-A electrical interface and provides one 25-pin "D" shell, male type connector. Maximum: One. Cable: Serial Adapter Cable (P/N 6450217) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter/A. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes. Limitations: The High Speed Adapter/A must be installed in the IBM Personal System/2 System Unit.

Publications: Guide To Operations (P/N 65X1902)

Specify	Form #	Language
#1033	GK2T-0951	US English
#1034	GK10-0003	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 High Speed Adapter/A are:

IBM High Speed Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
65X1902	GK2T-0951	US English
65X1924	GK10-0003	Spanish

IBM High Speed Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
65X0824	SK2T-0953	US English
94X2387	SY12-8508	German
94X2376	SY11-1030	French

IBM High Speed Adapter/A Technical Reference (TR)

P/N	Form #	Language
65X0825	SC18-2155	US English

3117 Adapter/A (#1029)(P/N 65X1920): Allows connection of the 3117 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of the IBM Personal System/2 System Unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005, P/N 6456807) is required. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes.

Publication: Guide To Operation (P/N 65X1922)

Specify	Form #	Language
#1031	GK2T-0950	US English
#1032	GK10-0001	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 3117 Adapter/A are:

IBM 3117 Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
65X1922	GK2T-0950	US English
65X1951	GK10-0001	Spanish

IBM 3117 Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
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IBM 3117 Adapter/A Technical Reference (TR)

P/N	Form #	Language
65X0823	SC18-2153	US English

(Except LAD> IBM PC Network Adapter II /A (#1222, P/N 1501222): The IBM PC Network Adapter II /A is a feature card specifically designed for connecting the new Personal System/2 Model 50, Model 60, and Model 80 computers to the broadband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds.

This new adapter features a 2M bps transmission speed with CSMA/CD access protocol. It supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II /A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or

printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3-meter coaxial cable is supplied.

The IBM LAN Support Program allows this adapter to run with applications written for either the NETBIOS or APPC/PC interfaces.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061).<) (Except LAD> IBM PC Network Adapter II /A supports US English and National Languages for UK English, French, German, Italian and Spanish.<.)

- (Except LAD> A feature card for Personal System/2 Model 50.
- A feature card for Personal System/2 Model 60.
- A feature card for Personal System/2 Model 80.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL) only on new systems shipped without a hardfile.<.)
- (Except LAD> National Language Support for English, German, French, Spanish and Italian.<.)

(Except LAD> Specified Operating Environment

- Machine requirements:

IBM PC Network Adapter II /A requires a full size adapter slot in one of the following system units:

Personal System/2 Model 50
Personal System/2 Model 60
Personal System/2 Model 80

- Programming requirements:

IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher.<.)

(Except LAD> IBM PC Network Baseband Adapter/A (#1223, P/N 1501223): IBM PC Network Baseband Adapter/A is a feature card specifically designed for connecting Personal System/2 Model 50, Model 60, and Model 80 computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds. It is not designed to operate in the Personal System/2 Model 30.

The card features a 2M bps transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter/A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter/A supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to 8 workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to 10 daisy chains with 8 workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately.<) (Except LAD> IBM PC Network Baseband Adapter /A supports US English and National Languages for UK English, French, German, Italian and Spanish.<.)

- (Except LAD> A feature card for Personal System/2 Model 50
- A feature card for Personal System/2 Model 60
- A feature card for Personal System/2 Model 80

MACHINES

- Modular baseband transceiver for connection to the baseband IBM PC Network
- Supports 802.2/LLC protocols
- Supports Remote Initial Program Load (RIPL) on the new systems shipped without hardfiles <
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment:

- Machine requirements:

IBM PC Network Baseband Adapter/A requires a full size adapter slot in one of the following system units:

Personal System/2 Model 50
Personal System/2 Model 60
Personal System/2 Model 80

- Programming requirements:

IBM LAN Support Program (P/N 83X7873)
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher <)

3270 Connection (#2000, P/N 83X9702): Adapter card necessary for 3278/79 emulation. It provides 3270 Display Station emulation for the 8550, 8560 and 8580 (models 041 and 071 only) system units. This feature will fit in either the floor or desk top model. Diagnostics are provided with the card. Prerequisites: None. Customer Setup (CSU): Yes.

Highlights:

- Attachment of the 8550, 8560 8580 (models 41 and 071 only) system units to the following:
 - 3174 Control Unit
 - 3274 Control Unit
 - 4321 Processor Display/Printer Adapter
 - 4331 Processor Display/Printer Adapter
 - 4361 Processor Display/Printer Adapter
 - 4702 Finance Communication Processor
 - 3276 Control Unit
 - 9370 Workstation Subsystem Controller
- Supports emulation of 3278 Display Station Model 2 and 3279 Color Display Station Model 2A or S2A, with certain restrictions.
- Supports both CUT and DFT modes of operation. (Supports DFT mode only on controllers that have the DFT feature installed).
- Supports CUT mode only when attached to a 9370 Workstation Subsystem Controller.
- Can be installed by the customer.
- No host hardware or host system software modifications required for 3270 emulated functions.
- Attachment of the 3274, 3174 or 9370 Workstation Subsystem Controller via the 3299 terminal multiplexer is supported.

Standard Features: The IBM 3270 Connection, "IBM 3270 Quick Reference Manual" and Diagnostic Diskette.

Description:

The IBM 3270 Connection is a circuit card that plugs into a slot of the 8550, 8560 and 8580 (models 41 and 071 only) system. A cable receptacle mounted on the card provides for attachment of a customer-supplied coaxial cable, IBM cabling system media (3174, 3274 or 9370 Workstation Subsystem Controller attachment only) or telephone twisted pair via IBM/ROLM coax to twisted pair adapter at the rear of the system unit. Most, but not all of the emulated displays are supported.

Specify:

Support for the adapter is provided by IBM Personal Computer 3270 Emulation Programs which provide host communication support via 3270 Display Station Emulation.

The 3270-PC file transfer program (5664-281 for VM/SP with or without HPO, 5665-311 for MVS/TSO, VSE/SP 2.1.1, 2.1.2 or SSX/VSE 1.4.1 or IBM equivalent is required for file transfer.

Physical Specifications of Hardware:

- Width - 8 inches
- Depth - Less than 1 inch
- Height - 4 inches
- Weight - Less than 1 pound

Operating Environment:

The specific operating environment of the 3270 connection feature is the same as the System Unit in which it is installed.

Publications:

- The "IBM 3270 Connection Technical Reference", GA23-0339, P/N 83X9705, #2002
- The "IBM 3270 Connection Quick Reference", G126-0190, P/N 83X9717, #2001

IBM Communications Adapter Cable (#2067, P/N 1502067): The Communications Adapter Cable feature supports the attachment of a modem to the Multi-Protocol Adapter/A or the system unit serial port connector at the rear of the 8560. The cable is double-shielded and approximately 3m (10 ft) long. This cable is required to connect a Multi-Protocol Adapter/A to an external modem or other data communications equipment.

80287 Math Co-Processor (#3001, P/N 6450356): The 10M Hz 80287 Math Co-Processor provides additional processing power and performance for application programs requiring many or repetitive arithmetic calculations. The 80287 conforms to the ANSI/IEEE floating-point standard. This option is installed in the math co-processor socket on the system board and does not require an expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

80286 Memory Expansion Option (#3006, P/N 6450344): The 80286 Memory Expansion Option provides 512KB of memory as standard. Up to three 80286 Memory Expansion Kits (#3012, P/N 6450345), with 512KB each, can be added to the expansion option to provide a total of 2MB of memory for each card.

Up to seven fully-populated Memory Expansion Options can be installed in the 8560 to provide 14MB of memory on the system in addition to the 1MB standard on the system board. No switch setting is required. Maximum: Seven for the 8560. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

80286 Memory Expansion Kit (#3012, P/N 6450345): The 80286 Memory Expansion Kit provides 512KB of memory and can only be installed on the 80286 Memory Expansion Option (#3006, P/N 6450344). No switch setting is required. Maximum: Three per Memory Expansion Option. Field Installation: Yes. Customer Setup: Yes. Prerequisites: #3006.

Dual Async Adapter/A (#3033, P/N 6450347): This option provides asynchronous communications on two independent RS-232-C ports. The option is programmable and supports communications speeds from 50 bps to 19.2K bps. This adapter supports signal transmission across distances of up to 50 feet.

A maximum of three Dual Async Adapters can be physically attached providing a total of seven serial ports (one on the system board plus two per adapter). Total system load will limit the practical number of ports and the speed of each port. Maximum: Three. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

Multi-Protocol Adapter/A (#3042, P/N 6450348): This option provides a full-duplex or half-duplex multi-protocol serial data transmission channel. It supports asynchronous, bisynchronous, HDLC, or SDLC protocols. It will support modems or direct attachment. The option is programmable at speeds from 50 bps to 19.2K bps and supports

automatic protocol switching via software at setup. Maximum: Two. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

44MB Fixed Disk Drive (#3046, P/N 6450354): The 44MB Fixed Disk Drive is available for the 8560-041 and 8580-041. This option attaches via the standard disk drive adapter provided with the system unit, and does not require an expansion slot.

Formatted Capacity:

44MB
512 bytes per sector
17 sectors per track
733 cylinders

Transfer Rate: 5M bps

Access Time (Including Settle):

Track to Track: 10 ms
Average: 40 ms (traverse 1/3 cylinders)
Maximum: 80 ms

Maximum: One. Field Installation: Yes. Prerequisite: An available open D position. Customer Setup: Yes.

70MB Fixed Disk Drive (#3051, P/N 6450355): The 70MB Fixed Disk Drive is available for the 8560-071 and 8580-041. This option attaches via the standard high performance (ESDI) disk drive adapter provided with the system unit and does not require an expansion slot. The ESDI adapter, (standard with the 8560-071 and 8580-071), increases the data transfer rate and increases data reliability.

Formatted Capacity:

70MB
512 bytes per sector
36 sectors per track
583 cylinders

Transfer Rate: 10M bps

Access Time:

Single Cylinder Seek: 5 ms (average)
Average Seek: 30 ms (weighted)
Full Seek: 60 ms (maximum)

Maximum: One. Field Installation: Yes. Prerequisite: An available open D position. Customer Setup: Yes.

1.44MB Diskette Drive (#3057, P/N 6450353): This feature is a double-sided, 3.5-inch diskette drive that supports 3.5-inch media providing 1.44MB of formatted storage capacity. The drive uses the diskette controller on the system planar board. When installed, it becomes the B drive.

The drive will operate in two modes: low density and high density. In low density mode, the drive is compatible with the 720KB (3.5-inch) diskette drive. In high density mode, it doubles the data capacity to 1.44MB and the data rate to 500K bps.

The 1.44MB Diskette Drive formats, reads, and writes either 1MB or 2MB diskettes. The 1.44MB Diskette Drive should NOT be used to format a:

- 1MB diskette as 1.44MB, or
- 2MB diskette as 720KB

Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 80286 Expanded Memory Adapter/A (#3920, P/N 1497252): Provides 2MB of expanded memory function for the IBM Personal System/2 Models 50 and 60. It also supports the device drivers resident within the IBM 3270 Workstation Program Versions 1.0 or 1.1 which provide application programs with expanded memory support, an "EMS" interface, and up to two PC DOS virtual disk interfaces.

The "EMS" is the Expanded Memory Specification issued by Lotus, Intel and MICROSOFT.

The IBM Personal System/2 80286 Expanded Memory Adapter/A extends the memory of Personal System/2 Models 50 and 60 up to 2MB of memory when using the IBM 3270 Workstation Program Versions 1.0 or 1.1. Users may run up to six PC DOS sessions and/or up to four host sessions concurrently. PC DOS applications written to the Expanded Memory Specification and/or requiring virtual disk are also supported by the IBM 3270 Workstation Program when utilizing the IBM Personal System/2 80286 Expanded Memory Adapter/A.

The IBM Personal System/2 80286 Expanded Memory Adapter/A on the 8550 and 8560 extends the memory to 3MB of memory when using IBM Operating System/2 (Standard and Extended Edition). Multiple IBM Personal System/2 80286 Expanded Memory Adapter/A features may be installed to extend the system memory when running IBM Operating System/2 (Standard and Extended Edition). Customer Setup: Yes. Limitations: One per 8550 and 8560 when using the IBM 3270 Workstation Program. Field Installation: Yes. Cable Order: None.

Display Adapter 8514/A (#4054, P/N 1887972): This adapter provides support for advanced interactive text, image, and graphics applications. The following new display modes are supported:

- 640 x 480 pels in 16 colors
- 1024 x 768 pels in 16 colors

When configured with the 8514 Color Display it is suited for applications that require advanced function, high performance and large screen content (1024 x 768 format). It also supports the 8503 Monochrome Display as well as the 8512 and 8513 Color Displays. A Memory Expansion Kit (#4081, P/N 1887987) can be attached to provide enhanced color capabilities. Maximum: One. Field Installation: Yes. Prerequisites: An available expansion slot. Customer Setup: Yes.

8514 Memory Expansion Kit (#4081, P/N 1887989): This Memory Expansion Kit provides 512KB of additional memory for the IBM Display Adapter 8514/A (#4054, P/N 1887972) to provide enhanced color capability. When configured with a 8514 Color Display, this additional memory increases the number of colors supported to 256 and grey scales to 64 while utilizing the 1024 x 768 mode. Maximum: One. Field Installation: Yes. Prerequisite: IBM Display Adapter 8514/A. Customer Setup: Yes.

6157 Streaming Tape Drive Adapter (#4160): Provides for attachment of the 6157 Streaming Tape Drive to Personal System/2 models 50, 60, and 80 family of processors. The 6157 allows fast, convenient save/restore and interchange capabilities on 1/4-inch magnetic tape cartridges when used in conjunction with the SY-TOS/IBM Tape Utilities.

- Allows fast and convenient data save/restore
- Permits data interchange using 1/4-inch magnetic tape cartridges

Maximum: Only one adapter can be attached per Personal System/2 models 50, 60, and 80 system. Prerequisites: IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 1.1 licensed program (P/N 75X1147). Customer Setup (CSU): Yes.

Operating Environment

- Machine Requirements
 - Any model of Personal System/2 Models 50, 60, and 80 and the 6157 Streaming Tape Drive.
- Programming Requirements
 - IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 2.0 licensed program (75X1147).

IBM Token-Ring Network Adapter/A (#4790 P/N 69X8138): IBM Token-Ring Network attachment for the Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 is available through this option. The adapter transmits and receives at a speed of four million bpi using protocols conforming to IEEE 802.5 and ECMA 89 standards. The

adapter provides logical link control functions conforming with the IEEE 802.2 standard. The adapter is compatible with International Standard ISO - 8802/5. The adapter provides 16K bytes of Random Access Memory (RAM) for increased message segment size and/or increasing the number of link stations supported by the adapter.

The IBM Token-Ring Network Adapter/A is a feature card for the Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 systems. The adapter contains a microprocessor operating under control of adapter resident microcode. This adapter requires one slot.

A diskette is included with the adapter which contains an adapter description file, adapter diagnostic and a single ring network diagnostic. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as an aid in network problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented. The IBM Token-Ring Network Problem Determination Guide (form number SX27-3710) should be obtained for instructions on how to use the ring diagnostic.

An Installation and Testing Instructions document is included with the adapter to assist the customer with the adapter set up.

Prerequisites: A customer supplied attachment cable is required for connecting the adapter to the network cabling system. The IBM Token-Ring Network PC Adapter Cable (#3390, P/N 6339098) for the IBM Cabling System available from IBM or the Type 3 Media Filter for the IBM Type 3 cable available from Authorized Referenced IBM Distributors. Customer Setup (CSU): Yes.

Highlights:

- Transmits and Receives at 4 million bits per second
- Provides 16KB of Random Access Memory (RAM)
- Designed specifically for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 new advanced I/O channel to take advantage of the greater 80286 and 80386 processing speeds.
- Provides for Remote Program Load (RPL) as an optional feature

Publications:

- P/N 83X9112 - IBM Token-Ring Network Hardware Maintenance Reference and Service
- P/N 6466690 - IBM Token-Ring Network PC Technical Reference - Chapter 9
- IBM Token-Ring Network Adapter/A
 - P/N 69X8138 - US English
 - P/N 83X7490 - France
 - P/N 83X7498 - Germany
 - P/N 83X7502 - Italy
 - P/N 83X7510 - Norway

System 36/38 Work Station Emulation for the IBM Personal System/2 /A Installation Convenience Kit Version 1.0 (#6287, P/N 69X6287): This option provides S/36 and S/38 Terminal Emulation as a 3196 Display attached via the normal twinaxial interface and supports four display sessions, file transfer and concurrent operation. Host Printer Emulation and Host Graphics Emulation are also supported.

This option includes the IBM System Work Station 36/38 Adapter, IBM System 36/38 Work Station Emulation Program, IBM System 36/38 Work Station Emulation Attachment Cable, Diagnostic Diskette, Quick Reference Manual and Software User's Guide.

This adapter requires one expansion slot.

IBM System 36/38 Work Station Emulation Adapter/A (#6279) and Attachment Cable (#6293): The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable offer a new IBM Personal System/2 emulation product for twinax attachment to the System/36 and System/38 as a work station. These products offer enhanced

functions beyond that established by the IBM Enhanced 5250 Emulation Product.

The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable allows specified IBM Personal System/2 models to emulate either 3196 or 5292-2 work station displays or 5256, 5219, 5224, or 5225 printers. The adapter is attached to the twinax cable used in System 36/38 environments. In combination with the IBM System 36/38 Work Station Emulation, Version 1.1.0, this adapter allows the user to access the application programs on the System 36/38 as if he were at a 3196 or 5292-2 work station. As a printer, the user can print the output of System 36/38 application programs on a printer attached to the IBM Personal System/2. The IBM System 36/38 Work Station Emulation Program provides limited multi-tasking capabilities which allows the IBM Personal System/2 to interact with the System 36/38 as if it were four separate terminals or printers. That is, the user can easily switch between up to four different System 36/38 tasks as well as one DOS task.

The following models of the IBM Personal System/2 are supported:

- 8550-021
- 8560-041
- 8560-071
- 8580-041
- 8580-071
- 8580-111

Specify:

Support for the adapter is provided by IBM System 36/38 Work Station Emulation Programs which provide host communication support via 5250 emulation. Prerequisites: None. Customer Setup (CSU) Yes.

Highlights:

- Four Work Station Sessions

The IBM System 36/38 Work Station Emulation program allows the user to establish one to four sessions with a System/36 or System/38. The sessions can be any combination of printer, display, or host graphics sessions that does not exceed four sessions total.

- On Card 8088 Processor

The on card 8088 processor reduces the timing dependencies on the PC processor.

Standard Features: The IBM System 36/38 Work Station Emulation Adapter/A, IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable.

Physical Specifications of Hardware:

Width - 11.5 inches
 Depth - Less than 1 inch
 Height - 3.5 inches
 Weight - Less than 1 pound

Operation Environment The specific operating environment of the IBM System 36/38 Work Station Emulation Adapter/A is the same as the system unit in which it is installed.

Product Numbers

- IBM System 36/38 Work Station Emulation Installation Convenience Kit/A, Version 1.0
 - (APG Only > English US, P/N 69X6287
 - Uppercase English, P/N 59X3285 <)
 - (LAD Only > English US, P/N 69X6287
 - Latin American Spanish, P/N 59X3243 <)
 - (Canada Only > English US, P/N 69X6287
 - French Canadian, P/N 59X3276 <)

IBM Internal Optical Disk Drive (#8700, P/N 63X4166): This features provides 200MB of storage capacity per removable Optical Disk Cartridge (P/N 63X4199). Once written, files cannot be erased but can be removed from directories. It is recommended as a supplement to a fixed disk for higher capacity storage, and for applications

where removability of the disk is important (security, archive, or portable data bases). The optical disk is installed internally as a second disk drive occupying the D position of the 8560.

This feature includes the 5.25-inch drive, the controller adapter, device support software (including a save/restore function) for IBM Personal Computer DOS 3.3 or higher, and a diagnostic diskette. Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot and disk drive D position. Customer Setup: Yes.

5.25-Inch External Diskette Drive Adapter/A (#8760, P/N 6450245): This feature allows the 4869 5.25-inch External Diskette Drive (360KB) to be connected to the 8560. The option consists of an adapter card, an internal cable assembly, and a feature card. The adapter card plugs into the connector for the 3.5-inch B drive. When installed, it becomes the B drive. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available expansion slot and an open B drive position.

Mouse (#8770, P/N 6450350): The 2-button mechanical Mouse is available for applications that operate more efficiently using a pointing-type device. The Mouse plugs into the system pointing device port and requires no additional hardware features or external power. A device driver is included with each Mouse, and should be used with supporting applications. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisite: System pointing device port.

IBM Token-Ring Network Adapter/A - Remote Program Load (#8881, P/N 83X8881): IBM Token-Ring Network Adapter/A - Remote Program Load (RPL) is an EPROM designed to be plugged into an available socket on the IBM Token-Ring Network Adapter/A (#4790) card. It is required for each of the devices on the network which are to be loaded from a loading device. The RPL feature will automatically issue a request to be loaded any time the device is reset and if the device has no system disk available. (Example: Power-on, CTRL-ALT-DEL). The loading device program is the responsibility of the user and is not provided with this feature.

Each RPL Feature Kit contains one 8K EPROM module with micro code, a 3-1/2 inch diskette containing a sample program for the loading device, and a publication. The publication contains the following: Introduction, Installing the Remote Program Load module, and Programming Requirements.

Specified Operating Environment:

Machine requirements:

8550 Model 021
8560 Model 041, 071
8580 Model 041, 071

Program Requirements:

IBM Local Area Network Support Program - P/N 83X7873

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

IBM Personal System/2 Data Migration Facility (#5003, P/N 1501224): The Data Migration Facility is a connecting tool for transferring customer files from an IBM Personal Computer system to an 8560 system. It provides data and program transfer capability from 5.25-inch IBM Personal Computer systems to the 8560's fixed disk drive or 3.5-inch media.

It operates via a standard IBM printer cable on a 5150, 5155, 5160, 5162, or 5170 system and the parallel port on the 8560.

The Data Migration Facility includes a 5.25-inch diskette with a "send" program, the connector itself, and the appropriate instructions for use. A "receive" program, also required, is included on the Reference Diskette packaged with each new system.

DOS 2.0 or later is required on the sending system and IBM DOS 3.3 is required on the receiving system. An IBM Personal Computer Printer Cable (P/N 1525612) must be attached to one of the following adapters on the host IBM Personal Computer system.

Adapter	Feature Code	P/N
Parallel	#5200	1505200
Monochrome/Printer	#4900	1504900
Serial/Parallel	#0215	6450215

Maximum: One. Field Installation: Yes. Prerequisites: IBM Printer Cable P/N 1525612 and IBM DOS 2.0 or higher (sending system) and DOS 3.3 (receiving system) Customer Setup: Yes.

Copying Licensed Programs:

- IBM grants the user permission to copy IBM Licensed Programs, using the Data Migration Facility, to a new medium. No additional rights are granted to the user beyond those stated in the user's original IBM Program License Agreement. Therefore use of an IBM program remains restricted to one machine at a time unless otherwise stated by IBM.
- For non-IBM programs, the user should consult the applicable license agreement that governs its use or contact the program supplier to determine restrictions on copying.

Since some programs are "copy protected" or may restrict the number of copies, the user has the responsibility to assure the copied program functions before erasing other copies of the program.

(Canada only > Accessories can be ordered through the National Distribution Division NDD), Dayton, NJ, using the appropriate part numbers, or by calling IBM DIRECT on 1-800-426-2468. <)

SUPPLIES

3.5-inch, 2MB Diskette (P/N 6404078)

8580 PERSONAL SYSTEM/2 MODEL 80

THERE IS MORE THAN ONE TEXT VERSION FOR THIS PRODUCT

PURPOSE

IBM 8580 enhances the System/2 family of systems by offering a new level of performance in personal computing for both commercial and compute-intensive environments. This system is highlighted by the Micro Channel(TM) Architecture with a 16M Hz 80386 32-bit microprocessor, high density memory technology, and a wide range of integrated features. With the capability of supporting up to 16MB of high speed (80ns) real memory, over 140MB of disk storage, advanced graphics, and an optional 16 MHz 80387 Math Co-Processor, this system opens up a wide range of application opportunities.

Designed to meet the requirements of the multitasking environment, the IBM 8580 provides a full 32-bit large system architecture and function within an individual workstation. Its increased speed and high reliability coupled with a wide selection of connectivity options provides the function required to support large server, gateway or multiuser applications. The IBM 8580 is designed to maintain compatibility with most existing software products for IBM Personal Computer systems.

The IBM 8580 has a RAM loadable character generator. This allows for any code page that utilizes one of the supported text modes to be loaded. National Language Support is provided for the following 11 languages: Danish, Dutch, English UK, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish and Swedish. In addition, the keyboard support is provided on the systems diskette.

(Canada Only > The IBM 8580 and the new version of IBM DOS will provide the capability to load the French/Canadian code page 863 with character set 993 in addition to the languages listed above. <)

MODELS 041 AND 071

Model 041: System unit/keyboard; 1MB of system board memory, a 1.44MB, 3.5-inch diskette drive, a 44MB fixed disk drive, the disk controller adapter, a diskette controller, a keyboard port, a serial port, a parallel port, a pointing device port, and a video graphics array port; this port supports graphics and text modes (640 X 480 graphics, 720 X 400 text, 320 x 200 graphics in 256 colors), and maintains compatibility with CGA and EGA modes.

Model 071: System unit/keyboard; 2MB of system board memory, a 1.44MB, 3.5-inch diskette drive, a 70MB fixed disk drive, the disk controller adapter, a diskette controller, a keyboard port, a serial port, a parallel port, a pointing device port, and a video graphics array port; this port supports graphics and text modes (640 X 480 graphics, 720 X 400 text, 320 x 200 graphics in 256 colors), and maintains compatibility with CGA and EGA modes.

Prerequisites: Attachment of one of the following displays or equivalent:

- An IBM 8512 Color Display Model 001
- An IBM 8503 Monochrome Display Model 001
- An IBM 8513 Color Display Model 001
- An IBM 8514 Color Display Model 001 and the IBM Display Adapter 8514/A
- An IBM 8512 Model 002 Color Display (Northern Hemisphere)
- An IBM 8512 Model 003 Color Display (Southern Hemisphere)
- An IBM 8503 Model 002 Monochrome Display (Northern Hemisphere)
- An IBM 8503 Model 003 Monochrome Display (Southern Hemisphere)
- An IBM 8513 Model 002 Color Display (Northern Hemisphere)
- An IBM 8513 Model 003 Color Display (Southern Hemisphere)
- An IBM 8514 Model 002 Color Display (Northern Hemisphere) and the IBM Display Adapter 8514/A (#4054)

- An IBM 8514 Model 003 Color Display (Southern Hemisphere) and the IBM Display Adapter 8514/A (#4054)

IBM Operating System/2 Standard Edition users require Version 1 Release 1. IBM DOS users require DOS Version 3.3.

Customer Setup (CSU): All models and special features of the IBM 8580 are customer setup.

HIGHLIGHTS

- Micro Channel Architecture with a 16 and 32-bit bus
- Increased processing speed (80386/80387 16M Hz)
- 80 nano-second memory, 1 megabit chips
- Improved multitasking and communications capabilities
- High level of graphics and text quality
- Large capacity 44MB or 70MB fixed disk, 1.44MB, 3.5-inch diskette drive
- High level of feature integration on the system board
- Ease of installation and configuration
- Auto-Restart Power Supply

Increased number of national languages are supported.

Standard Features:

- 80386 16M Hz 32-bit processor
- 1MB of 80ns memory on the system board (2MB on 8580-071)
- 3.5-inch 1.44MB Diskette Drive
- 5.25-inch 44MB Hardfile (8580-041) or
- 5.25-inch 70MB Hardfile (8580-071)
- Fixed Disk Controller Adapter (occupies one of the 5-16 bit slots)
- Integrated Diskette Controller
- Integrated Serial port
- Integrated Parallel port
- Integrated Video Graphics Array controller/port
- Pointing Device port
- Keyboard port
- Enhanced Keyboard w/cable
- 8 I/O bus slots (5-16 bit, 3-16/32 bit)

DESCRIPTION

The IBM Personal System/2 Model 80 (IBM 8580) is a high-end solution within the System/2 family. This floor-standing system is available in the following models: the 8580-041 with 1MB of memory and a 44MB fixed disk (upgradable to 88MB) and the 8580-071 with 2MB of Memory and a 70MB fixed disk (upgradable to 140MB). The 8580 incorporates the latest IBM and industry technologies in an innovative package, designed expressly for the business office environment.

This system unit features the Intel 80386 16M Hz microprocessor and the Micro Channel Architecture. Internally, the microprocessor is partitioned into six functional units that can process multiple instructions simultaneously for improved performance. The 32-bit architecture of the microprocessor is extended through the 8580 system design reducing performance bottlenecks. The Micro Channel Architecture supports both 16 and 32-bit I/O and memory adapter cards. Further, it offers the advantages of adapter recognition (no setup switches) for each configuration, and improved diagnostic and fault isolation for better availability and the IBM Enhanced Personal Computer Keyboard for ease of operation.

The system has two levels of BIOS that total 128KB. There is a Compatibility BIOS (CBIOS) with memory addressability of up to one megabyte that provides compatible support for current application programs. An additional version of BIOS, Advanced BIOS (ABIOS) has extended memory addressability (up to 16 megabytes) and provides support for multitasking operating systems.

Additional features of the System Unit include: eight I/O bus slots (five 16-bit, three 16/32-bit (one 16-bit slot is occupied by the disk controller adapter)), a 225-watt universal power supply, a time/date clock with a long life lithium battery, additional positions for a second fixed disk drive and for a second 3.5-inch diskette drive. The 8580 supports the new IBM 8503, 8512, 8513, and 8514 analog displays which together with the new VGA built-in function provide significant enhancements to graphics and text capabilities. This ability to display more colors using larger palettes with enhanced resolution widely expands new application opportunities. The Auto Restart feature enables the power supply to automatically restart, (if the power supply outputs drop out of regulation due to an AC line outage), when AC power returns. This feature provides increased availability of the system unit by allowing it to be programmed for unattended restart after power outages.

The following new features also provide additional capabilities:

- A 80387 Math Co Processor, provides enhanced performance in arithmetic calculations
- A 80386 System Board Memory Expansion Kit, completes the 2MB memory capacity of the system board (8580-041)
- A 80386 Memory Expansion Option, provides additional memory in 32-bit slots
- A 80386 Memory Expansion Kit, provides 2MB of memory to the Memory Expansion Option

Performance: The 80386 16M Hz 32-bit microprocessor coupled with the new Micro Channel Architecture and high-speed memory allows the Personal System/2 Model 80 to perform up to 3 times faster than the IBM Personal Computer AT Model 339.

The 80386 16M Hz 32-bit microprocessor operating with the 80387 16M Hz Math Co-Processor allows the 8580 to perform arithmetic calculations up to four times faster than the IBM Personal Computer AT Model 339 with the 80287.

A Disk Cache program is available on the Reference Diskette (included in the Quick Reference manual), which the user can install with IBM DOS 3.3. This program is designed to provide enhanced disk performance for most applications.

The IBM Personal System/2 Model 80 supports English US and National Languages for English UK, Danish, Dutch, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, and Swedish.

I/O Devices Supported Include:

- Displays:
 - (Canada Only > 8503 Monochrome Display Model 001
 - 8513 Color Display Model 001
 - 8514 Color Display Model 001
 - 8512 Color Display Model 001 (<)
 - 8503 Monochrome Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
 - 8513 Color Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
 - 8514 Color Display Model 002 (Northern Hemisphere), Model 003 (Southern Hemisphere)
 - 8512 Color Display Model 002 (Northern Hemisphere), Model 003
- Printers:
 - 3812 Model 1 Page Printer
 - 3852 Model 2 Color Jetprinter
 - 4201 Model 1 Proprietary
 - 4202 Model 1 Proprietary/XL
 - 5201 Model 1 Quietwriter
 - 5201 Model 2 Quietwriter
 - 5216 Model 2 Wheelprinter
 - 5223 Model 1 Wheelprinter E
 - 4201 Proprietary II
 - 4207 Model 1 Printer
 - 4208 Model 1 Printer
 - 5202 Quietwriter III
- Plotters:

- IBM 6180 Color Plotter
- IBM 6186 Model 1, 2 Color Plotter (03/87)
- IBM 7372 Color Plotter
- IBM 6184 Color Plotter
- IBM 7374 Color Plotter
- IBM 7375 Model 1, 2 Color Plotter

● Scanners:

- IBM 3117 Scanner
- IBM 3118 Scanner

● Tape:

- 6157 Streaming Tape Drive

● Other Devices:

- 4869 5.25-inch External Diskette Drive
- 3363 - A11 Optical Disk Storage Unit
- 3363 - B01 Optical Disk Storage Unit
- ROLM phone 244 PC

● Cables

Physical Specifications:

Width - 165.1mm (6.5 inches)
Depth - 482.6mm (19.0 inches)
Height - 597.2mm (23.5 inches)
Weight - 23.6 kg (52 pounds)

Operating Environment:

● Ambient Air Temperature:

System on: 15.6 - 32.2 degrees C (60 - 90 degrees F)
System off: 10 - 43 degrees C (50 - 110 degrees F)

● Humidity:

System on: 8 - 80 percent RH
System off: 5 - 80 percent RH

Publications: Standard publications have been significantly reduced in size by incorporating most operator information along with diagnostic and utility programs on the system Quick Reference diskette.

The following material will be included with each system unit shipped:

- The IBM 8580 Quick Reference manual is the user's operations manual. Designed for ease of use, it is 70 pages long with color art on approximately 80 percent of its pages.

The Reference Diskette contains a complete system tutorial, diagnostics, and a utilities program. One copy is included in the ship group of each IBM 8580.

- 8580 Quick Reference Manual - S68X-2259, P/N 68X2259
- (Canada Only > 8580 Quick Reference Manual (Canada, French) - S68X-2278, P/N 68X2278 (<))
- (LAD Only > 8580 Quick Reference Manual (Spanish) - P/N 95X3316 (<))

Additional copies will be available for a fee from Mechanicsburg.

The following publications will be available from Mechanicsburg.

These publications are for service personnel and detail many aspects of maintaining the machine. They include instructions for identifying the failure of a replaceable unit, a parts catalog, and the system diskette (which contains advanced diagnostics).

- Hardware Maintenance Service II Supplement
- S68X-2255, P/N 68X2255
- Hardware Maintenance Reference Supplement
- S68X-2254, P/N 68X2254
- Hardware Maintenance Library

- (Canada Only) > French - P/N 95X3347 <
- (LAD Only) > Spanish - P/N 95X3368 <
- Technical Reference Manuals
 - Technical Reference - the Technical Reference Manual is for programmers, engineers, and others who want to understand the IBM 8580 in greater detail. This reference manual includes functional specifications, hardware specifications and printouts for peripheral connectors.
 - ▲ Technical Reference manual (TRM)
 - The IBM Personal System/2 and Personal Computer BIOS Interface Manual documents the BIOS interface for the Personal System/2 and IBM Personal Computers.
 - Technical Reference Option Modules include the functional specifications for programmers, engineers and others who want to understand the options and adapters in greater detail.
 - ▲ Technical Reference Options/Adapter (TRO/A)
 - ▲ TRO/A 2MB - 6MB Memory Expansion Option
- Technical Reference - S68X-2256, P/N 68X2256
- Technical Reference (TRO/A) - S229-9612, P/N 6322509
- Technical Reference (BIOS) - S68X-2260, P/N 68X2260
- TRO/A Memory Option - S68X-2257, P/N 68X2257
- Other Documentation: The installation instructions for options contain the instructions to install the option, a warranty, and where appropriate, basic operational instructions. These publications are shipped with the options.

SLSS is not available for any of the above publications. Purchasable publications are available through IBM, Authorized PC Dealers or the "Technical Directory".

SPECIFY (NONE)

SPECIAL FEATURES

IBM Serial Adapter Cable (#0217, P/N 6450217): This is a 3m (10 ft) cable with a 9 pin D-shell to connect to the Dual Async Adapter/A and a 25 pin D-shell connector providing all the signals of an EIA RS-232-C interface which can connect the serial port to an appropriate serial device.

IBM Serial Adapter Connector (#0242, P/N 6450242): This adapter is a 10 in. cable with a 9 pin D-shell to connect to the Dual Async Adapter/A and a 25 pin d-shell connector providing all the signals for an EIA RS-232 interface for connecting the serial port to an appropriate serial device which has its own cable.

IBM Personal System/2 300/1200 Internal Modem/A (#0349, P/N 6450349): The 300/1200 Internal Modem/A provides the capability to transmit data in duplex mode over the Public Switched Telephone Network at 300 or 1200 bits/second and supports the "AT" Command set. The 300/1200 modem is compatible with the Bell 212A and 103 practice (asynchronous only) recommendation for transmitting data over the Public Switched Telephone Network. Compatible IBM modems include: IBM Personal Computer 1200 b/s Modem and the IBM 5841 Modem (asynchronous mode only).

This modem provides Canadian Approval for the Terminal Attachment Program (TAP) standard CS-03.

A seven foot communications cable and a diagnostic diskette are supplied with the modem adapter. Maximum: Seven. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

High Speed Adapter/A (#1028) (P/N 65X1900): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of IBM Personal System/2 System Unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS 422-A driver and Receiver. The adapter is designed to the EIQ RS-422-A electrical interface and provides one 25-pin "D" shell, mail type connector. Maximum: One. Cable: Serial Adapter Cable (P/N 6450217) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter/A. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes. Limitations: The High Speed Adapter/A must be installed in the IBM Personal System/2 System Unit.

Publications: Guide To Operations (P/N 65X1902)

Specify	Form #	Language
#1033	GK2T-0951	English US
#1034	GK10-0003	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 High Speed Adapter/A are:

IBM High Speed Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
65X1902	GK2T-0951	English US
65X1924	GK10-0003	Spanish

IBM High Speed Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
65X0824	SK2T-0953	English US
94X2387	SY12-8508	German
94X2376	SY11-1030	French

IBM High Speed Adapter/A Technical Reference (TR)

P/N	Form #	Language
65X0825	SC18-2155	English US

3117 Adapter/A (#1029, P/N 65X1920): Allows connection of the 3117 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of the IBM Personal System/2 System Unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005, P/N 6456807) is required. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes.

Publication: Guide To Operation (P/N 65X1922)

Specify	Form #	Language
#1031	GK2T-0950	English US
#1032	GK10-0001	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 3117 Adapter/A are:

IBM 3117 Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
65X1922	GK2T-0950	English US
65X1951	GK10-0001	Spanish

IBM 3117 Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
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IBM3117 Adapter/A Technical Reference (TR)

P/N	Form #	Language
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65X0823	SC18-2153	English US

(Except LAD> IBM PC Network Adapter II /A (#1222, P/N 1501222): The IBM PC Network Adapter II /A is a feature card specifically designed for connecting the new IBM Personal System/2 Model 50, Model 60, and Model 80 computers to the broadband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds.

This new adapter features a 2 megabit-per-second transmission speed with CSMA/CD access protocol. It supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II /A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3 meter coaxial cable is supplied.

The IBM LAN Support Program allows this adapter to run with applications written for either the NETBIOS or APPC/PC interfaces.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). <) (Except LAD> IBM PC Network Adapter II /A supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for IBM Personal System/2 Model 50.
- A feature card for IBM Personal System/2 Model 60.
- A feature card for IBM Personal System/2 Model 80.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL) only on new systems shipped without a hardfile. <)
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment

- Machine requirements:

IBM PC Network Adapter II /A requires a full size adapter slot in one of the following system units:

IBM Personal System/2 Model 50
IBM Personal System/2 Model 60
IBM Personal System/2 Model 80

- Programming requirements:

IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher. <)

(Except LAD> IBM PC Network Baseband Adapter/A (#1223, P/N 1501223): IBM PC Network Baseband Adapter/A is a feature card specifically designed for connecting IBM Personal System/2 Model 50, Model 60, and Model 80 computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds. It is not designed to operate in the IBM Personal System/2 Model 30.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter/A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter/A supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to 8 workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to 10 daisy chains with 8 workstations each can connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately. <) (Except LAD> IBM PC Network Baseband Adapter /A supports English US and National Languages for English UK, French, German, Italian and Spanish. <)

- (Except LAD> A feature card for IBM Personal System/2 Model 50
- A feature card for IBM Personal System/2 Model 60
- A feature card for IBM Personal System/2 Model 80
- Modular baseband transceiver for connection to the baseband IBM PC Network
- Supports 802.2/LLC protocols
- Supports Remote Initial Program Load (RIPL) on the new systems shipped without hardfiles <)
- (Except LAD> National Language Support for English, German, French, Spanish and Italian. <)

(Except LAD> Specified Operating Environment:

- Machine requirements:

IBM PC Network Baseband Adapter/A requires a full size adapter slot in one of the following system units:

IBM Personal System/2 Model 50
IBM Personal System/2 Model 60
IBM Personal System/2 Model 80

- Programming requirements:

IBM LAN Support Program (P/N 83X7873)
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher <)

3270 Connection (#2000, P/N 83X9702): Adapter card necessary for 3278/79 emulation. It provides 3270 Display Station emulation for the 8550, 8560 and 8580 (models 041 and 071 only) system units. This feature will fit in either the floor or desk top model. Diagnostics are provided with the card. Prerequisites: None. Customer Setup (CSU): Yes.

Highlights:

- Attachment of the 8550, 8560, 8580 (models 041 and 071 only) system units to the following:
 - IBM 3174 Control Unit
 - IBM 3274 Control Unit
 - IBM 4321 Processor Display/Printer Adapter
 - IBM 4331 Processor Display/Printer Adapter
 - IBM 4361 Processor Display/Printer Adapter
 - IBM 4702 Finance Communication Processor
 - IBM 3276 Control Unit
 - IBM 9370 Workstation Subsystem Controller
- Supports emulation of IBM 3278 Display Station Model 2 and IBM 3279 Color Display Station Model 2A or S2A, with certain restrictions.

- Supports both CUT and DFT modes of operation. (Supports DFT mode only on controllers that have the DFT feature installed).
- Supports CUT mode only when attached to a 9370 Workstation Subsystem Controller.
- Can be installed by the customer.
- No host hardware or host system software modifications required for 3270 emulated functions.
- Attachment of the IBM 3274, 3174 or 9370 Workstation Subsystem Controller via the IBM 3299 terminal multiplexer is supported.

Standard Features: The IBM 3270 Connection, IBM 3270 Quick Reference Manual and Diagnostic Diskette.

Description:

The IBM 3270 Connection is a circuit card that plugs into a slot of the 8550, 8560 and 8580 (models 41 and 071 only) system. A cable receptacle mounted on the card provides for attachment of a customer supplied coaxial cable, IBM cabling system media (3174, 3274 or 9370 Workstation Subsystem Controller attachment only) or telephone twisted pair via IBM/ROLM coax to twisted pair adapter at the rear of the system unit. Most, but not all of the emulated displays are supported.

Specify:

Support for the adapter is provided by IBM Personal Computer 3270 Emulation Programs which provide host communication support via 3270 Display Station Emulation.

The 3270-PC file transfer program (5664-281 for VM/SP with or without HPO, 5665-311 for MVS/TSO, VSE/SP 2.1.1.2.1.2 or SSX/VSE 1.4.1 or IBM equivalent is required for file transfer.

Physical Specifications of Hardware:

- Width - 8 inches
- Depth - Less than 1 inch
- Height - 4 inches
- Weight - Less than 1 pound

Operating Environment:

The specific operating environment of the 3270 connection feature is the same as the System Unit in which it is installed.

Publications:

- The IBM 3270 Connection Technical Reference, GA23-0339, P/N 83X9705, #2002
- THE IBM 3270 Connection Quick Reference, G126-0190, P/N 83X9717, #2001

IBM Communications Adapter Cable (#2067, P/N 1502067): The Communications Adapter Cable feature supports the attachment of a modem to the Multi-Protocol Adapter/A or the system unit serial port connector at the rear of the IBM 8580. The cable is double-shielded and approximately 10 feet (3 meters) long. A wrap connector is provided to test the cable. This cable is required to connect the BSC or SDLC adapter to an external modem or other data communications equipment.

IBM Personal System/2 80387 Math Co-Processor (#3002, P/N 6450369): The 16M Hz 80387 Math Co-Processor provides additional processing power and performance for application programs requiring many or repetitive arithmetic calculations. The 80386/80387 conforms to the ANSI/IEEE floating-point standard and runs most applications, written for the 80286/80287 and 8086/8087 based systems, unmodified. This option is installed in the Math Co-Processor socket on the system board and does not require an expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 System Board Memory Expansion Kit (#3009) (P/N 6450375): This 80386 Memory Expansion Kit provides 1MB of 80 nano-second memory (8580-041 only) on the system board. The addition of this feature completes the 2MB capacity of

the system board. No switch setting is required. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 80386 Memory Expansion Option (#3019) (P/N 6450367): The 80386 Memory Expansion Option is an IBM 8580 card that comes standard with 2MB 80ns memory. Up to two Memory Expansion Kits can be added to the card to provide a total of 6MB of memory. Additional 80386 Memory Expansion Options can be installed to provide a maximum of 16MB of memory on the system. This option can be used without fully populating the system board memory slots and has no switch setting requirements. Limitations: 16MB of memory (the 16 bit channel of the DMA addresses only 16MB). Maximum: Three. Field Installation: Yes. Prerequisite: An available 32 bit expansion slot. Customer Setup: Yes.

IBM Personal System/2 Dual Async Adapter/A (#3033, P/N 6450347): This option provides asynchronous communication on two independent RS-232-C ports. It occupies one expansion slot. The option is fully programmable and supports communications speeds from 50 to 19,200 bps. This adapter supports signal transmission across 50 feet of cable.

A maximum of three Dual Async Adapters can be physically attached providing a total of seven serial ports (one on the system board plus two per adapter.) Total system load will limit the practical number of ports and the speed of each port.

Maximum: Three. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 Multi-Protocol Adapter/A (#3042, P/N 6450348): This option can provide a full-duplex or half-duplex multiprotocol serial data transmission channel. It supports asynchronous, bisynchronous, HDLC, or SDLC protocols. It will support modems or direct attachment. The option is fully programmable at speeds of up to 19,200 bps and supports automatic protocol switching via software at setup. Maximum: Two. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 44MB Fixed Disk Drive (#3046, P/N 6450354): The 44MB Fixed Disk Drive is provided for the IBM 8580-041. This file attaches via the standard disk drive adapter provided with the system unit and does not require an additional expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 70MB Fixed Disk Drive (#3051, P/N 6450355): The 70MB Fixed Disk Drive is provided for the IBM 8580-071. This file attaches via the high performance (ESDI) disk adapter provided with the system unit and does not require an additional expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 1.44MB Diskette Drive (#3057) (P/N 6450353): This feature is a double-sided, 3.5-inch diskette drive that supports 3.5-inch media with 1.44MB of formatted storage capacity. The drive uses the diskette controller on the system board. When installed, it becomes the B drive.

The drive will operate in two modes: low density and high density. In low density mode, it will be totally compatible to the 720KB (3.5-inch) diskette drive. In high density mode, it doubles the data capability to 1.44MB and the data rate to 500K bps. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 80386 Memory Expansion Kit (#3064) (P/N 6450372): This 80386 Memory Expansion Kit uses one megabit chips, provides 2MB of 80 nano-second memory and can be installed only on the 80386 Memory Expansion Option card, (#3019). Memory read operations are performed at the same speed as the system board memory through the use of a unique architectural feature called "Matched Memory Cycle." No switch setting is required. Maximum: Two per Memory Expansion Option. Field Installation: Yes. Customer Setup: Yes.

IBM Personal System/2 Display Adapter 8514/A (#4054, P/N 1887972): This adapter provides support for advanced interactive text, image and graphics applications. The following new display modes are supported:

- 640 x 480 pels in 16 colors and gray scales
- 1024 x 768 pels in 16 colors and gray scales

The Display Adapter 8514/A provides support for attachment of one of the following displays: IBM 8503, 8512, 8513 and 8514. Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM Personal System/2 8514 Memory Expansion Kit (#4081, P/N 1887989): This Memory Expansion Kit provides an 512KB of additional memory and can be installed only on the IBM Display Adapter 8514/A, (#4054). This option increases the number of colors supported to 256 and gray scale to 64. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

6157 Streaming Tape Drive Adapter (#4160, P/N 92X1458): Provides for attachment of the IBM 6157 Streaming Tape Drive to IBM Personal System/2 models 50, 60, and 80 family of processors. The 6157 allows fast, convenient save/restore and interchange capabilities on 1/4-inch magnetic tape cartridges when used in conjunction with the SY-TOS/IBM Tape Utilities.

- Allows fast and convenient data save/restore
- Permits data interchange using 1/4-inch magnetic tape cartridges

Maximum: Only one adapter can be attached per IBM Personal System/2 models 50, 60, and 80 system. Prerequisites: IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 1.1 licensed program (P/N 75X1147). Customer Setup (CSU): Yes.

Operating Environment

- Machine Requirements
 - Any model of IBM Personal System/2 Models 50, 60, and 80 and the IBM 6157 Streaming Tape Drive.
- Programming Requirements
 - IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 2.0 licensed program (75X1147).

IBM Token-Ring Network Adapter/A (#4790, P/N 69X8138): IBM Token-Ring Network attachment for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041. 071 is available through this option. The adapter transmits and receives at a speed of four million bpi using protocols conforming to IEEE 802.5 and ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard. The adapter is compatible with International Standard ISO - 8802/5. The adapter provides 16K bytes of Random Access Memory (RAM) for increased message segment size and/or increasing the number of link stations supported by the adapter.

The IBM Token-Ring Network Adapter/A is a feature card for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 systems. The adapter contains a microprocessor operating under control of adapter resident microcode. This adapter requires one slot.

A diskette is included with the adapter which contains an adapter description file, adapter diagnostic and a single ring network diagnostic. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as an aid in network problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented. The IBM Token-Ring Network Problem Determination Guide, SX27-3710, should be obtained for instructions on how to use the ring diagnostic.

An Installation and Testing Instructions document is included with the adapter to assist the customer with the adapter set up.

Prerequisites: A customer supplied attachment cable is required for connecting the adapter to the network cabling system. The IBM Token-Ring Network PC Adapter Cable (#3390, P/N 6339098) for the IBM Cabling System available from IBM or the Type 3 Media Filter

for the IBM Type 3 cable available from Authorized Referenced IBM Distributors. Customer Setup (CSU): Yes.

Highlights:

- Transmits and receives at 4 million bits per second
- Provides 16Kb of Random Access Memory (RAM)
- Designed specifically for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 new advanced I/O channel to take advantage of the greater 80286 and 80386 processing speeds.
- Provides for Remote Program Load (RPL) as an optional feature

Publications:

- P/N 83X9112 - IBM Token-Ring Network Hardware Maintenance Reference and Service
- P/N 6466690 - IBM Token-Ring Network PC Technical Reference - Chapter 9
- IBM Token-Ring Network Adapter/A

P/N 69X8138 - English US
P/N 83X7490 - France
P/N 83X7498 - Germany
P/N 83X7502 - Italy
P/N 83X7510 - Norway

IBM System 36/38 Work Station Emulation for the IBM Personal System/2 /A Installation Convenience Kit Version 1.0 Kit (#6287, P/N 69X628): This option provides IBM System/36 and IBM System/38 terminal Emulation as a 3196 Display attached via the normal Twinaxial Interface and supports four display sessions, file transfer and concurrent operation. Host Printer Emulation and Host Graphics Emulation are also supported.

This option includes the IBM System 36/38 Work Station Emulation Adapter, System 36/38 Work Station Emulation Program, System 36/38 Work Station Emulation Attachment Cable, Diagnostic Diskette, Quick reference Manual and Software users Guide. Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Set-up: Yes.

IBM System 36/38 Work Station Emulation Adapter/A (#6279) and Attachment Cable (#6293): The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable offer a new IBM Personal System/2 emulation product for twinax attachment to the System/36 and System/38 as a work station. These products offer enhanced functions beyond that established by the IBM Enhanced 5250 Emulation Product.

The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable allows specified IBM Personal System/2 models to emulate either 3196 or 5292-2 work station displays or 5256, 5219, 5224, or 5225 printers. The adapter is attached to the twinax cable used in System 36/38 environments. In combination with the IBM System 36/38 Work Station Emulation, Version 1.1.0, this adapter allows the user to access the application programs on the System 36/38 as if he were at a 3196 or 5292-2 work station. As a printer, the user can print the output of System 36/38 application programs on a printer attached to the IBM Personal System/2. The IBM System 36/38 Work Station Emulation Program provides limited multi-tasking capabilities which allows the IBM Personal System/2 to interact with the System 36/38 as if it were four separate terminals or printers. That is, the user can easily switch between up to four different System 36/38 tasks as well as one DOS task.

The following models of the IBM Personal System/2 are supported:

- 8550-021
- 8560-041
- 8560-071
- 8580-041
- 8580-071
- 8580-111

Specify:

Support for the adapter is provided by IBM System 36/38 Work Station Emulation Programs which provide host communication support via 5250 emulation. Prerequisites: None. Customer Setup (CSU) Yes.

Highlights:

- **Four Work Station Sessions**

The IBM System 36/38 Work Station Emulation program allows the user to establish one to four sessions with a System/36 or System/38. The sessions can be any combination of printer, display, or host graphics sessions that does not exceed four sessions total.

- **On Card 8088 Processor**

The on card 8088 processor reduces the timing dependencies on the PC processor.

Standard Features: The IBM System 36/38 Work Station Emulation Adapter/A, IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable.

Physical Specifications of Hardware:

Width - 11.5 inches
 Depth - Less than 1 inch
 Height - 3.5 inches
 Weight - Less than 1 pound

Operation Environment: The specific operating environment of the IBM System 36/38 Work Station Emulation Adapter/A is the same as the system unit in which it is installed.

Product Numbers:

- **IBM System 36/38 Work Station Emulation Installation Convenience Kit/A, Version 1.0**
 - (APG Only > English US, P/N 69X6287
 - Uppercase English, P/N 59X3285 <)
 - (LAD Only > English US, P/N 69X6287
 - Latin American Spanish, P/N 59X3243 <)
 - (Canada Only > English US, P/N 69X6287
 - French Canadian, P/N 59X3276 <)

IBM Personal System/2 5.25-inch External Diskette Drive Adapter/A (#8760, P/N 6450245): This feature allows the IBM 4869, 5.25-inch External Diskette Drive, to be connected to the IBM 8580 system. The option consists of an adapter card, an internal cable assembly, and a feature card. The adapter card plugs into the connector for the 3.5-inch drive. The feature card occupies one expansion slot in the IBM 8580 system. The internal cable is a 34-pin flat cable and is used to connect the two cards. When installed, it becomes the B Drive. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 16 bit expansion slot and an open B drive position.

IBM Personal System/2 Mouse (#8770, P/N 6450350): The 2-button Mouse is available for applications that operate more efficiently using a pointing device. The Mouse attaches to the system pointing device port and requires no additional hardware features or external power. A device driver is packaged with each Mouse for addition to the operating system. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Token-Ring Network Adapter/A - Remote Program Load (#8881, P/N 83X8881): IBM Token-Ring Network Adapter/A - Remote Program Load (RPL) is an EPROM designed to be plugged into an available socket on the IBM Token-Ring Network Adapter/A (#4790) card. It is required for each of the devices on the network which are to be loaded from a loading device. The RPL feature will automatically issue a request to be loaded any time the device is reset and if the device has no system disk available. (Example: Power-on, CTRL-ALT-DEL). The loading device program is the responsibility of the user and is not provided with this feature.

Each RPL Feature Kit contains one 8K EPROM module with micro code, a 3-1/2 inch diskette containing a sample program for the loading device, and a publication. The publication contains the following: Introduction, Installing the Remote Program Load module, and Programming Requirements.

Specified Operating Environment:

- **Machine requirements:**

8550 Model 021
 8560 Model 041, 071
 8580 Model 041, 071

- **Program Requirements:**

IBM Local Area Network Support Program - P/N 83X7873

IBM Internal Optical Disk Drive (#8700) (P/N 63X4166): This feature provides 200MB of storage capacity per removable Optical Disk Cartridge (P/N 63X4199). Once written, files cannot be erased but can be removed from directories. It is recommended as a supplement to a fixed disk for higher capacity storage, and for applications where removability of the disk is important (security, archive, or portable data bases). The optical disk is installed internally as a second disk drive occupying the D position of the IBM 8580.

This feature includes the 5.25-inch drive, the controller adapter, device support software (including a save/restore function) for IBM Personal Computer DOS 3.3 or higher, and a diagnostic diskette. Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot and disk drive D position. Customer Setup: Yes.

IBM Printer Adapter Cable (#5612) (P/N 1525612)

IBM Token Ring PC Adapter Cable (#3390) (P/N 6339098)

IBM PC Network Baseband Adapter Cable (#1229) (P/N 1501229)

IBM Cabling System PC Network Baseband Cable (#1227) (P/N 1501227)

ACCESSORIES

(Canada Only > Accessories can be ordered through the National Distribution Division (NDD), Dayton, NJ, using the appropriate part numbers, or by calling IBM Direct on 1-800-426-2468. <)

SUPPLIES

3.5-inch, 2.0 Megabyte diskette (P/N 6404078)

8580 PERSONAL SYSTEM/2 MODEL 80 (8580-111)**PURPOSE**

The Personal System/2 Model 80 (8580-111) enhances the family of systems by offering a new level of performance in personal computing for both commercial and compute-intensive environments. The 8580-111 is highlighted by the Micro Channel(TM) Architecture with a 20M Hz 80386 32-bit microprocessor, high-density memory technology, and a wide range of integrated features. With the capability of supporting up to 16Mb of high-speed (80ns) real memory, over 230Mb of disk storage, advanced graphics, and an optional 80387 Math Co-Processor, this system opens up a wide range of application opportunities.

Designed to meet the requirements of the multitasking environment, the 8580-111 provides a full 32-bit large system architecture and function within an individual workstation. Its increased speed and high reliability coupled with a wide selection of connectivity options provides the function required to support large server, gateway or multiuser applications. The 8580-111 is designed to maintain compatibility with most existing software products for IBM Personal Computer systems.

The 8580-111 has a RAM-loadable character generator. This allows for any code page that utilizes one of the supported text modes to be loaded. The new operating systems announced today, will provide this capability. National Language Support is provided for the following languages: Danish, Dutch, English (UK), Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, and Swedish. In addition, the keyboard support is provided on the systems diskette.

(Canada only > The 8580 and the new version of IBM DOS will provide the capability to load the French/Canadian code page 863 with character set 993 in addition to the languages listed under World Trade.<)

MODEL 111

Model 111: System unit/keyboard; 2Mb of system board memory, a 1.44Mb, 3.5-inch diskette drive, a 115Mb fixed disk drive, the disk controller adapter, a diskette controller, a keyboard port, a serial port, a parallel port, a pointing device port, and a video graphics array port that supports two modes (640 X 480 graphics, 720 X 400 text), and compatibility with CGA and EGA.

Prerequisites: Attachment of one of the following displays or equivalent:

- An 8512 Color Display Model 001
- An 8503 Monochrome Display Model 001
- An 8513 Color Display Model 001
- An 8514 Color Display Model 001 and the Display Adapter 8514/A
- An 8512 Model 002 Color Display (Northern Hemisphere)
- An 8512 Model 003 Color Display (Southern Hemisphere)
- An 8503 Model 002 Monochrome Display (Northern Hemisphere)
- An 8503 Model 003 Monochrome Display (Southern Hemisphere)
- An 8513 Model 002 Color Display (Northern Hemisphere)
- An 8513 Model 003 Color Display (Southern Hemisphere)
- An 8514 Model 002 Color display (Northern Hemisphere) and the Display Adapter 8514/A (#4054)
- An 8514 Model 003 Color Display (Southern Hemisphere) and the Display Adapter 8514/A (#4054)

IBM Operating System/2 Standard Edition users require Version 1 Release 1. IBM DOS users require DOS Version 3.3.

Customer Setup (CSU): All models and special features of the 8580-111 are customer setup.

HIGHLIGHTS

The IBM Personal System/2 Model 80 (8580-111) features the following:

- Micro Channel Architecture with a 16- and 32-bit bus
- Increased processing speed (80386 20M Hz)
- 80 nanosecond memory, 1Mb chips
- Improved multitasking and communications capabilities
- High level of graphics and text quality
- Large capacity 115Mb fixed disk, 1.44Mb, 3.5-inch diskette drive
- High level of feature integration on the system board
- Ease of installation and configuration
- Auto-Restart Power Supply
- Increased number of national languages are supported.

Standard Features

The following features are standard on the 8580-111:

- 80386 20M Hz 32-bit processor
- 2Mb of 80ns memory on the system board
- 3.5-inch 1.44Mb Diskette Drive
- 5.25-inch 115Mb Hardfile
- Fixed Disk Controller Adapter (occupies one of the five 16-bit slots)
- Integrated Diskette Controller
- Integrated Serial port
- Integrated Parallel port
- Integrated Video Graphics Array controller/port
- Pointing Device port
- Keyboard port
- Enhanced Keyboard w/cable
- 8 I/O bus slots (five 16-bit, three 16/32-bit)

Physical Specifications:

Width: 165.1mm (6.5 inches)
Depth: 482.6mm (19.0 inches)
Height: 597.2mm (23.5 inches)
Weight: 23.6kg (52 lbs.)

Operating Environment:

- Ambient Air Temperature:
System on: 15.6 - 32.2C (60 - 90F)
System off: 10 - 43C (50 - 110F)
- Humidity:
System on: 8 - 80 percent RH
System off: 5 - 80 percent RH

Publications: Standard publications have been significantly reduced in size by incorporating most operator information along with diagnostic and utility programs on the system Quick Reference diskette.

The following material will be included with each system unit shipped:

- The "IBM 8580 Quick Reference Manual is the user's operations manual. Designed for ease of use, with color art on approximately 80 percent of its pages.
- The Reference Diskette contains a complete system tutorial, diagnostics, utilities, and a demonstration program. One copy is included in the ship group of each 8580.
- S68X-2259 (P/N 68X2259) 8580 Quick Reference Manual
- (Canada only > S68X-2278 (P/N 68X2278) (French) 8580 Quick Reference Manual

Additional copies will be available for a fee from Mechanicsburg (May 25, 1987).<

The following publications will be available from Mechanicsburg May 25, 1987.

These publications are for service personnel and detail many aspects of maintaining the machine. They include instructions for identifying the failure of a replaceable unit, a parts catalog, and the system diskette (which contains advanced diagnostics).

- S68X-2255, P/N 68X2255, Hardware Maintenance Service II Supplement
- S68X-2254, P/N 68X2254 Hardware Maintenance Reference Supplement
- (Canada only > (French) Hardware Maintenance Service II Supplement
- P/N 95X3347 (French) Hardware Maintenance Library <)
- (LAD only > P/N 95X3368 (Spanish) Hardware Maintenance Library <)

Technical Reference Manuals:

- Technical Reference - the "Technical Reference Manual" (TRM) is for programmers, engineers, and others who want to understand the 8580 in greater detail. This reference manual includes functional specifications, hardware specifications and printouts for peripheral connectors.
- The "IBM Personal System/2 and Personal Computer BIOS Interface Manual" documents the BIOS interface for the Personal System/2 and IBM Personal Computers.
- "Technical Reference Option Modules" include the functional specifications for programmers, engineers and others who want to understand the options and adapters in greater detail.
 - Technical Reference Options/Adapter (TRO/A)
 - TRO/A 2Mb - 6Mb Memory Expansion Option
- S68X-2256, P/N 68X2256 Technical Reference Manual
- S229-9612, P/N 6322509 Technical Reference Options/Adapter (TRO/A)
- S68X-2260, P/N 68X2260 Technical Reference (BIOS)
- S68X-2257, P/N 68X2257 TRO/A Memory Option

Other Documentation: The installation instructions for options contain the instructions to install the option, a warranty, and where appropriate, basic operational instructions. These publications are shipped with the options.

SLSS is not available for any of the above publications. Purchasable publications are available through IBM, Authorized PC Dealers or the "Technical Directory".

DESCRIPTION

The 8580-111 is a high-end solution within the family. The floor-standing system unit of the 8580-111 has 2Mb of memory and a 115Mb fixed disk drive (upgradable to 230Mb). The 8580-111 incorporates the latest IBM and industry technologies in an innovative package, designed expressly for the business office environment.

The 8580-111 features the Intel 80386 20M Hz microprocessor and the Micro Channel Architecture. Internally, the microprocessor is partitioned into six functional units that can process multiple instructions simultaneously, enabling processing of multiple instructions simultaneously for improved performance. The 32-bit architecture of the microprocessor is extended through the 8580-111 system design reducing performance bottlenecks. The Micro Channel Architecture supports both 16- and 32-bit I/O and memory adapter cards. Further, it offers the advantages of adapter recognition (no setup switches) for each configuration, and improved diagnostic and fault isolation for better availability and the IBM Enhanced Personal Computer Keyboard for ease of operation.

In addition to the 20M Hz processor speed, the standard Page Memory Logic on the system board enhances system performance by allowing the system to operate even faster with most applications.

Additional features of the System Unit include: 8 I/O bus slots (5 - 16-bit, 3 - 16/32-bit (one - 16-bit slot is occupied by the disk controller

adapter)), a 225-watt universal power supply, a time/date clock with a lithium battery, additional for a second fixed disk drive and for a second 3.5-inch diskette drive. The 8580 supports the new 8503, 8512, 8513, and 8514 analog displays which together with the new VGA built-in function provide significant enhancements to graphics and text capabilities. This ability to display more colors using larger palettes with enhanced resolution widely expands new application opportunities.

The following new features are also announced to provide additional capabilities:

- A 80387 Math Co-Processor, provides performance in arithmetic calculations.
- A 80386 System Board Memory Expansion Kit, completes the 4Mb memory capacity of the system board.
- A 80386 Memory Expansion Option, provides additional memory in 32-bit slots.
- A 80386 Memory Expansion Kit, provides 2Mb of memory to the Memory Expansion Option.

The 8580-111 supports US English and National Languages for UK English, Danish, Dutch, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, and Swedish.

SPECIFY (NONE)

SPECIAL FEATURES

Serial Adapter Cable (#0217, P/N 6450217): This is a 3m (10 ft) cable with a 9-pin D-shell to connect to the Dual Asynchronous Adapter/A and a 25-pin D-shell connector providing all the signals of an EIA RS-232-C interface which can connect the serial port to an appropriate serial device.

Serial Adapter Connector (#0242, P/N 6450242): This adapter is a 10 in. cable with a 9-pin D-shell to connect to the Dual Asynchronous Adapter/A and a 25-pin D-shell connector providing all the signals for an EIA RS-232 interface for connecting the serial port to an appropriate serial device which has its own cable. Field Installation: Yes. Customer Setup: Yes.

(Canada only > 300/1200 Internal Modem/A (#0349, P/N 6450349): The 300/1200 Internal Modem/A provides the capability to transmit data in duplex mode over the Public Switched Telephone Network at 300 or 1200 bps and supports the "AT" Command set. The 300/1200 modem is compatible with the Bell 212A and 103 practice and CCITT V.22B (asynchronous only) recommendation for transmitting data over the Public Switched Telephone Network. Compatible IBM modems include: IBM Personal Computer 1200 bps Modem and the 5841 Modem (asynchronous mode only). A 7-foot communications cable and a diagnostic diskette are supplied with the modem adapter. Maximum: Four. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes. <)

High Speed Adapter/A (#1028) (P/N 65X1920): Provides for the attachment of the 3117 Scanner with Extension unit or 3118 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of IBM Personal System/2 System Unit. The adapter is fully programmable and supports asynchronous and synchronous communication protocols with data rate of up to 1M bps. The adapter contains Serial Communication Controller, a Data Buffer, a Direct Data Transfer control logic, and an RS 422-A driver and receiver. The adapter is designed to the EIQ RS-422-A electrical interface and provides one 25-pin "D" shell, male-type connector. Maximum: One. Cable: Serial Adapter Cable (P/N 6450217) is available for connection of 3117 Scanner with Extension unit or 3118 Scanner to the High Speed Adapter/A. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes. Limitations: The High Speed Adapter/A must be installed in the IBM Personal System/2 System Unit.

Publications: Guide To Operations (P/N 65X1902)

Specify Form # Language

#1033	GK2T-0951	English US
#1034	GK10-0003	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 High Speed Adapter/A are:

IBM High Speed Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
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65X1902	GK2T-0951	English US
65X1924	GK10-0003	Spanish

IBM High Speed Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
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65X0824	SK2T-0953	English US
94X2387	SY12-8508	German
94X2376	SY11-1030	French

IBM High Speed Adapter/A Technical Reference (TR)

P/N	Form #	Language
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65X0825	SC18-2155	English US

3117 Adapter/A (#1029)(P/N 65X1900): Allows connection of the 3117 Scanner to the IBM Personal System/2. This adapter is installed into one expansion slot of the IBM Personal System/2 System Unit. The adapter provides a connector for attachment of the 3117 Personal Computer Cable. The adapter converts analog output from the 3117 scanner device into digital image by the video circuit built in this adapter. Maximum: One. Cable: A 3117 Personal Computer Cable (#3005, P/N 6456807) is required. Field Installation: Yes. Prerequisites: An available expansion slot is required. Customer Setup: Yes.

Publication: Guide To Operation (P/N 65X1922)

Specify	Form #	Language
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#1031	GK2T-0950	English US
#1032	GK10-0001	Latin American Spanish

Publications available at a fee for the IBM Personal System/2 3117 Adapter/A are:

IBM 3117 Adapter/A Guide To Operations (GTO)

P/N	Form #	Language
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65X1922	GK2T-0950	English US
65X1951	GK10-0001	Spanish

IBM 3117 Adapter/A Hardware Maintenance and Service (HMS)

P/N	Form #	Language
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IBM3117 Adapter/A Technical Reference (TR)

P/N	Form #	Language
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65X0823	SC18-2153	English US

(Except LAD>IBM PC Network Adapter II /A (#1222, P/N 1501222): The IBM PC Network Adapter II /A is a feature card specifically designed for connecting the new IBM Personal System/2 Model 50, Model 60, and Model 80 computers to the broadband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds.

This new adapter features a 2 megabit-per-second transmission speed with CSMA/CD access protocol. It supports both the previously available PC Network protocol (contained on PC Network Adapter) via IBM PC Network Protocol Driver (P/N 6280061) and 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor. The IBM PC Network Adapter II /A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures. The adapter also supports the Remote Initial Program Load (RIPL) feature. A 3 meter coaxial cable is supplied.

The IBM LAN Support Program allows this adapter to run with applications written for either the NETBIOS or APPC/PC interfaces.

This adapter is also compatible with the IBM PC Network Adapter via the IBM PC Network Protocol Driver program (P/N 6280061). (Except LAD>IBM PC Network Adapter II /A supports English US and National Languages for English UK, French, German, Italian and Spanish.)

- (Except LAD>A feature card for IBM Personal System/2 Model 50.
- A feature card for IBM Personal System/2 Model 60.
- A feature card for IBM Personal System/2 Model 80.
- Modular broadband modem for connection to the PC Network.
- Supports previously available PC Network protocol (contained on PC Network Adapter) and 802.2/LLC.
- Supports Remote Initial Program Load (RIPL) only on new systems shipped without a hardfile.)
- (Except LAD>National Language Support for English, German, French, Spanish and Italian.)

(Except LAD>Specified Operating Environment

- Machine requirements:

IBM PC Network Adapter II /A requires a full size adapter slot in one of the following system units:

IBM Personal System/2 Model 50
IBM Personal System/2 Model 60
IBM Personal System/2 Model 80

- Programming requirements:

IBM PC Network Protocol Driver (P/N 6280061) or IBM LAN Support Program (P/N 83X7873).
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher.)

(Except LAD>IBM PC Network Baseband Adapter/A (#1223, P/N 1501223): IBM PC Network Baseband Adapter/A is a feature card specifically designed for connecting IBM Personal System/2 Model 50, Model 60, and Model 80 computers to the baseband IBM PC Network. It is compatible with the form factor and bus design of these new PCs to take advantage of greater Intel 80286 and 80386 processing speeds. It is not designed to operate in the IBM Personal System/2 Model 30.

The card features a 2 megabit-per-second transmission speed with a CSMA/CD access protocol and supports 802.2/LLC protocols via IBM LAN Support Program (83X7873). The selected protocol and NETBIOS interface support are loaded into PC RAM to execute on the PC system processor.

The IBM PC Network Baseband Adapter/A ROM includes Power On Self Test (POST) diagnostics, which help the customer to identify adapter failure without diagnostic diskettes or printed problem determination procedures.

The adapter also supports the Remote Initial Program Load (RIPL) feature.

The IBM PC Network Baseband Adapter/A supports daisy chain as well as star topologies via the IBM PC Network Baseband Extender (5173). Up to 8 workstations can be linked together in a chain topology with an overall length of up to 200 feet. A chain of workstations linked to the Baseband Extender can have an overall length of up to 400 feet. Up to 10 daisy chains with 8 workstations each can

connect to the Baseband Extender for a maximum of 80 workstations in the baseband IBM PC Network. The cable required for the baseband adapter must be ordered separately.<) (Except LAD> IBM PC Network Baseband Adapter /A supports English US and National Languages for English UK, French, German, Italian and Spanish.<)

- (Except LAD> A feature card for IBM Personal System/2 Model 50
- A feature card for IBM Personal System/2 Model 60
- A feature card for IBM Personal System/2 Model 80
- Modular baseband transceiver for connection to the baseband IBM PC Network
- Supports 802.2/LLC protocols
- Supports Remote Initial Program Load (RIPL) on the new systems shipped without hardfiles.<)
- (Except LAD> National Language Support for English, German, French, Spanish and Italian.<)

(Except LAD> Specified Operating Environment:

- Machine requirements:

IBM PC Network Baseband Adapter/A requires a full size adapter slot in one of the following system units:

IBM Personal System/2 Model 50
IBM Personal System/2 Model 60
IBM Personal System/2 Model 80

- Programming requirements:

IBM LAN Support Program (P/N 83X7873)
IBM Personal Computer DOS 3.3 (P/N 6280060) or higher.<)

3270 Connection (#2000, P/N 83X9702): Adapter card necessary for 3278/79 emulation. It provides 3270 Display Station emulation for the 8550, 8560 and 8580 (models 041 and 071 only) system units. This feature will fit in either the floor or desk top model. Diagnostics are provided with the card. Prerequisites: None. Customer Setup (CSU): Yes.

Highlights:

- Attachment of the 8550, 8560, 8580 (models 041 and 071 only) system units to the following:
 - IBM 3174 Control Unit
 - IBM 3274 Control Unit
 - IBM 4321 Processor Display/Printer Adapter
 - IBM 4331 Processor Display/Printer Adapter
 - IBM 4361 Processor Display/Printer Adapter
 - IBM 4702 Finance Communication Processor
 - IBM 3276 Control Unit
 - IBM 9370 Workstation Subsystem Controller
- Supports emulation of IBM 3278 Display Station Model 2 and IBM 3279 Color Display Station Model 2A or S2A, with certain restrictions.
- Supports both CUT and DFT modes of operation. (Supports DFT mode only on controllers that have the DFT feature installed).
- Supports CUT mode only when attached to a 9370 Workstation Subsystem Controller.
- Can be installed by the customer.
- No host hardware or host system software modifications required for 3270 emulated functions.
- Attachment of the IBM 3274, 3174 or 9370 Workstation Subsystem Controller via the IBM 3299 terminal multiplexer is supported.

Standard Features: The IBM 3270 Connection, IBM 3270 Quick Reference Manual and Diagnostic Diskette.

Description:

The IBM 3270 Connection is a circuit card that plugs into a slot of the 8550, 8560 and 8580 (models 41 and 071 only) system. A cable receptacle mounted on the card provides for attachment of a customer supplied coaxial cable, IBM cabling system media (3174, 3274 or 9370 Workstation Subsystem Controller attachment only) or telephone twisted pair via IBM/ROLM coax to twisted pair adapter at the rear of the system unit. Most, but not all of the emulated displays are supported.

Specify:

Support for the adapter is provided by IBM Personal Computer 3270 Emulation Programs which provide host communication support via 3270 Display Station Emulation.

The 3270-PC file transfer program (5664-281 for VM/SP with or without HPO, 5665-311 for MVS/TSO, VSE/SP 2.1.1.2 or SSX/VSE 1.4.1 or IBM equivalent is required for file transfer.

Physical Specifications of Hardware:

- Width - 8 inches
- Depth - Less than 1 inch
- Height - 4 inches
- Weight - Less than 1 pound

Operating Environment:

The specific operating environment of the 3270 connection feature is the same as the System Unit in which it is installed.

Publications:

- The IBM 3270 Connection Technical Reference, GA23-0339, P/N 83X9705, #2002
- The IBM 3270 Connection Quick Reference, G126-0190, P/N 83X9717, #2001

Communications Adapter Cable (#2067, P/N 1502067): The Communications Adapter Cable feature supports the attachment of a modem to the Multi-Protocol Adapter/A or the system unit serial port connector at the rear of the 8580. The cable is double-shielded and approximately 3m (10 ft) long. A wrap connector is provided to test the cable. This cable is required to connect the BSC or SDLC adapter to an external modem or other data communications equipment.

80386 Memory Expansion Option (#3019, P/N 6450367): The 80386 Memory Expansion Option is a 8580 card that comes standard with 2Mb 80ns memory. Up to two Memory Expansion Kits can be added to the card to provide a total of 6Mb of memory. Additional 80386 Memory Expansion Options can be installed to provide a maximum of 16Mb of memory on the system. This option can be used without fully populating the system board memory slots and has no switch setting requirements. Limitations: 16Mb of memory (the 16-bit channel of the DMA addresses only 16Mb). Maximum: Two. Field Installation: Yes. Prerequisite: An available 32-bit expansion slot. Customer Setup: Yes.

Dual Asynchronous Adapter/A (#3033, P/N 6450347): This option provides asynchronous communication on two independent RS-232-C ports. It occupies one expansion slot. This adapter supports signal transmission across 50 feet of cable. Maximum: Three. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

Multi-Protocol Adapter/A (#3042, P/N 6450348): This option can provide a full-duplex or half-duplex multi-protocol serial data transmission channel. It supports asynchronous, bisynchronous, HDLC, or SDLC protocols. It will support modems or direct attachment. Maximum: Two. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

1.44Mb Diskette Drive (#3057, P/N 6450353): This feature is a double-sided, 3.5-inch diskette drive that supports 3.5-inch media with 1.44Mb of storage capacity. The drive uses the diskette controller on the system board. When installed, it becomes the B drive. The drive will operate in two modes: low density and high density. In low density mode, it will be totally compatible to the 720Kb (3.5-inch) diskette drive. In high-density mode, it doubles the data

capability to 1.44Mb and the data rate to 500K bps. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

80386 Memory Expansion Kit (#3064, P/N 6450372): This 80386 Memory Expansion Kit uses 1Mb chips, provides 2Mb of 80 nanosecond memory and can be installed only on the 80386 Memory Expansion Option card (#3019). No switch setting is required. Maximum: Two per Memory Expansion Option. Field Installation: Yes. Customer Setup: Yes.

Display Adapter 8514/A (#4054, P/N 1887972): This adapter provides support for advanced interactive text, image and graphics applications. The following new display modes are supported:

- 640 x 480 pels in 16 colors and gray scales
- 1,024 x 768 pels in 16 colors and gray scales

The Display Adapter provides support for attachment of one of the following displays: 8503, 8512, 8513, and 8514. Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

8514 Memory Expansion Kit (#4081, P/N 1887989): This Memory Expansion Kit provides an 512Kb of additional memory and can be installed only on the IBM Display Adapter 8514/A (#4054). This option increases the number of colors supported to 256 and gray scale to 64. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

6157 Tape Drive Adapter (#4160, P/N 92X1458): Provides for attachment of the IBM 6157 Streaming Tape Drive to IBM Personal System/2 models 50, 60, and 80 family of processors. The 6157 allows fast, convenient save/restore and interchange capabilities on 1/4-inch magnetic tape cartridges when used in conjunction with the SY-TOS/IBM Tape Utilities.

- Allows fast and convenient data save/restore
- Permits data interchange using 1/4-inch magnetic tape cartridges

Maximum: Only one adapter can be attached per IBM Personal System/2 models 50, 60, and 80 system. Prerequisites: IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 1.1 licensed program (P/N 75X1147). Customer Setup (CSU): Yes.

Operating Environment

- Machine Requirements
 - Any model of IBM Personal System/2 Models 50, 60, and 80 and the IBM 6157 Streaming Tape Drive.
- Programming Requirements
 - IBM PC DOS 3.3 (P/N 6280060), or equivalent, and the SY-TOS/IBM Tape Utilities Version 2.0 licensed program (75X1147).

IBM Token-Ring Network Adapter/A (#4790, P/N 69X8138): IBM Token-Ring Network attachment for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 is available through this option. The adapter transmits and receives at a speed of four million bpi using protocols conforming to IEEE 802.5 and ECMA 89 standards. The adapter provides logical link control functions conforming with the IEEE 802.2 standard. The adapter is compatible with International Standard ISO - 8802/5. The adapter provides 16K bytes of Random Access Memory (RAM) for increased message segment size and/or increasing the number of link stations supported by the adapter.

The IBM Token-Ring Network Adapter/A is a feature card for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 systems. The adapter contains a microprocessor operating under control of adapter resident microcode. This adapter requires one slot.

A diskette is included with the adapter which contains an adapter description file, adapter diagnostic and a single ring network diagnostic. The adapter diagnostic program is used to verify the correct operation of the adapter. The ring diagnostic program is used as

an aid in network problem determination. Permanent and recoverable error conditions are detected, and information on the probable source of the error is presented. The IBM Token-Ring Network Problem Determination Guide (form number SX27-3710) should be obtained for instructions on how to use the ring diagnostic.

An Installation and Testing Instructions document is included with the adapter to assist the customer with the adapter set up.

Prerequisites: A customer supplied attachment cable is required for connecting the adapter to the network cabling system. The IBM Token-Ring Network PC Adapter Cable (#3390, P/N 6339098) for the IBM Cabling System available from IBM or the Type 3 Media Filter for the IBM Type 3 cable available from Authorized Referenced IBM Distributors. Customer Setup (CSU): Yes.

Highlights:

- Transmits and Receives at 4 million bit per second
- Provides 16Kb of Random Access Memory (RAM)
- Designed specifically for the IBM Personal System/2 8550-021, 8560-041, 071 and 8580-041, 071 new advanced I/O channel to take advantage of the greater 80286 and 80386 processing speeds.
- Provides for Remote Program Load (RPL) as an optional feature

Publications:

- P/N 83X9112 - IBM Token-Ring Network Hardware Maintenance Reference and Service
- P/N 6466690 - IBM Token-Ring Network PC Technical Reference - Chapter 9
- IBM Token-Ring Network Adapter/A

P/N 69X8138 - English US
P/N 83X7490 - France
P/N 83X7498 - Germany
P/N 83X7502 - Italy
P/N 83X7510 - Norway

S/36/38 Workstation Emulation Installation Convenience Kit V1.0 (#6287, P/N 69X6287): This option provides System/36 and IBM System/38 terminal Emulation as a 3196 Display attached via the normal Twinaxial Interface and supports four display sessions, file transfer and concurrent operation. Host Printer Emulation and Host Graphics Emulation are also supported. This option includes the System 36/38 Workstation Emulation Adapter, System 36/38 Workstation Emulation Program, System 36/38 Workstation Emulation Attachment Cable, Diagnostic Diskette, "Quick Reference Manual" and "Software User's Guide". Maximum: One. Field Installation: Yes. Prerequisite: An available expansion slot. Customer Setup: Yes.

IBM System 36/38 Work Station Emulation Adapter/A (#6279) and Attachment Cable (#6293)

The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable offer a new IBM Personal System/2 emulation product for twinax attachment to the System/36 and System/38 as a work station. These products offer enhanced functions beyond that established by the IBM Enhanced 5250 Emulation Product.

The IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable allows specified IBM Personal System/2 models to emulate either 3196 or 5292-2 work station displays or 5256, 5219, 5224, or 5225 printers. The adapter is attached to the twinax cable used in System 36/38 environments. In combination with the IBM System 36/38 Work Station Emulation, Version 1.1.0, this adapter allows the user to access the application programs on the System 36/38 as if he were at a 3196 or 5292-2 work station. As a printer, the user can print the output of System 36/38 application programs on a printer attached to the IBM Personal System/2. The IBM System 36/38 Work Station Emulation Program provides limited multi-tasking capabilities which allows the IBM Personal System/2 to interact with the System 36/38 as if it were four separate terminals

or printers. That is, the user can easily switch between up to four different System 36/38 tasks as well as one DOS task.

The following models of the IBM Personal System/2 are supported:

- 8550-021
- 8560-041
- 8560-071
- 8580-041
- 8580-071
- 8580-111

Specify:

Support for the adapter is provided by IBM System 36/38 Work Station Emulation Programs which provide host communication support via 5250 emulation. Prerequisites: None. Customer Setup (CSU) Yes.

Highlights:

- Four Work Station Sessions

The IBM System 36/38 Work Station Emulation program allows the user to establish one to four sessions with a System/36 or System/38. The sessions can be any combination of printer, display, or host graphics sessions that does not exceed four sessions total.

- On Card 8088 Processor

The on card 8088 processor reduces the timing dependencies on the PC processor.

Standard Features: The IBM System 36/38 Work Station Emulation Adapter/A, IBM System 36/38 Work Station Emulation Adapter/A and Attachment Cable.

Physical Specifications of Hardware:

Width - 11.5 inches
Depth - Less than 1 inch
Height - 3.5 inches
Weight - Less than 1 pound

Operation Environment: The specific operating environment of the IBM System 36/38 Work Station Emulation Adapter/A is the same as the system unit in which it is installed.

Product Numbers:

- IBM System 36/38 Work Station Emulation Installation Convenience Kit/A, Version 1.0
 - (APG Only > English US, P/N 69X6287
 - Uppercase English, P/N 59X3285 <)
 - (LAD Only > English US, P/N 69X6287
 - Latin American Spanish, P/N 59X3243 <)
 - (Canada Only > English US, P/N 69X6287
 - French Canadian, P/N 59X3276 <)

IBM Internal Optical Disk Drive (#8700, P/N 63X4166): This feature provides 200Mb of storage capacity per removable Optical Disk Cartridge (P/N 63X4199). Once written, files cannot be erased but can be removed from directories. It is recommended as a supplement to a fixed disk for higher capacity storage, and for applications where removability of the disk is important (security, archive, or portable data bases). This feature includes the 5.25-inch drive, the controller adapter, device support software (including a save/restore function) for Personal Computer DOS 3.3 or higher, and a diagnostic diskette. Maximum: One. Field Installation: Yes. Prerequisites: An available expansion slot and disk drive D position. Customer Setup: Yes.

80387 Math Co-Processor (#8720, P/N 6450378): The 80387 Math Co-Processor provides additional processing power and performance for application programs requiring many or repetitive arithmetic calculations. The 80386/80387 conforms to the ANSI/IEEE floating-point standard and runs most applications, written for the 80286/80287 and 8086/8087 based systems, unmodified. This option

is installed in the Math Co-Processor socket on the system board and does not require an expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

80386 System Board Memory Expansion Kit (#8722, P/N 6450379): This 80386 Memory Expansion Kit provides 2Mb of 80 nanosecond memory on the system board. The addition of this feature completes the 4Mb capacity of the system board. No switch setting is required. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

115Mb Fixed Disk Drive (#8730, P/N 6450377): The 115Mb Fixed Disk Drive is provided for the 8580-071, 111, and 8560-071. This file attaches via the high performance (ESDI) disk adapter provided with the system unit and does not require an additional expansion slot. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

5.25-inch External Diskette Drive Adapter/A (#8760, P/N 6450245): This feature allows the 4869, 5.25-inch External Diskette Drive, to be connected to the 8580 system. The option consists of an adapter card, an internal cable assembly, and a feature card. The adapter card plugs into the connector for the 3.5-inch drive. The feature card occupies one expansion slot in the 8580 system. The internal cable is a 34-pin flat cable and is used to connect the two cards. When installed, it becomes the B Drive. Maximum: One. Field Installation: Yes. Customer Setup: Yes. Prerequisites: An available 16-bit expansion slot and an open B drive position.

Mouse (#8770, P/N 6450350): The 2-button Mouse is available for applications that operate more efficiently using a pointing device. The Mouse attaches to the system pointing device port and requires no additional hardware features or external power. A device driver is packaged with each Mouse for addition to the operating system. Maximum: One. Field Installation: Yes. Customer Setup: Yes.

IBM Token-Ring Network Adapter/A - Remote Program Load (#8881, P/N 83X8881): IBM Token-Ring Network Adapter/A - Remote Program Load (RPL) is an EPROM designed to be plugged into an available socket on the IBM Token-Ring Network Adapter/A (#4790) card. It is required for each of the devices on the network which are to be loaded from a loading device. The RPL feature will automatically issue a request to be loaded any time the device is reset and if the device has no system disk available. (Example: Power-on, CTRL-ALT-DEL). The loading device program is the responsibility of the user and is not provided with this feature.

Each RPL Feature Kit contains one 8K EPROM module with micro code, a 3-1/2 inch diskette containing a sample program for the loading device, and a publication. The publication contains the following: Introduction, Installing the Remote Program Load module, and Programming Requirements.

Specified Operating Environment:

- Machine requirements:

8550 Model 021
8560 Model 041, 071
8580 Model 041, 071

- Program Requirements:

IBM Local Area Network Support Program - P/N 83X7873

ACCESSORIES

Accessories can be ordered through the National Distribution Division (NDD), Dayton, NJ, using the appropriate part numbers, or by calling IBM DIRECT on 1-800-426-2468.

SUPPLIES

3.5-inch, 2.0 Megabyte diskette (P/N 6404078).

PERSONAL SYSTEM/2 MODEL 80 (8580-311)

PURPOSE

The IBM Personal System/2 Model 80 (8580-311) enhances the Personal System/2 family of systems by offering a standard 314Mb Fixed Disk Drive and the capability to expand to 628Mb of fixed disk storage. The 8580-311 is highlighted by the Micro Channel* Architecture with a 20MHz 80386 32-bit microprocessor, high density memory technology, and a wide range of integrated features. With the capability of supporting up to 16Mb of high speed (80ns) real memory, up to 628Mb of disk storage, advanced graphics, and an optional 80387 Math Co-processor, this system opens up a wide range of application opportunities.

* Trademark of International Business Machines Corporation

Designed to meet the requirements of the multitasking environment, the 8580-311 provides a full 32-bit large system architecture and function within an individual workstation. The 8580-311 is designed to maintain compatibility with most existing licensed programs for IBM Personal Computer systems.

(Canada only > The 8580-311 and the new version of IBM DOS announced April 2, 1987 provide the capability to load the French/Canadian code page 863 with character set 993 in addition to the languages listed under World Trade. <)

MODEL 311

Model 311: System unit/keyboard; 2Mb of system board memory, a 1.44Mb, 3.5-inch diskette drive, a 314Mb fixed disk drive, the disk controller adapter, a diskette controller, a keyboard port, a serial port, a parallel port, a pointing device port, and a Video Graphics Array Port that supports modes (640 X 480 graphics, 720 X 400 text, 320 X 200 graphics in 256 colors), and maintains compatibility with CGA and EGA.

Prerequisites: Attachment of one of the following displays or equivalent:

- A 8512 Color Display Model 001
- An 8503 Monochrome Display Model 001
- An 8513 Color Display Model 001
- An 8514 Color Display Model 001 and the Display Adapter 8514/A (#4054)
- (APG only > An 8512 Model 002 Color Display (Northern Hemisphere)
- An 8512 Model 003 Color Display (Southern Hemisphere)
- An 8503 Model 002 Monochrome Display (Northern Hemisphere)
- An 8503 Model 003 Monochrome Display (Southern Hemisphere)
- An 8513 Model 002 Color Display (Northern Hemisphere)
- An 8513 Model 003 Color Display (Southern Hemisphere)
- An 8514 Model 002 Color display (Northern Hemisphere) and the Display Adapter 8514/A (#4054)
- An 8514 Model 003 Color Display (Southern Hemisphere) and the Display Adapter 8514/A (#4054) <

Operating System/2 Standard Edition users require Version 1 Release 1. IBM DOS users require DOS Version 3.3.

Customer Setup (CSU): All models and special features of the 8580-311 are customer setup.

HIGHLIGHTS

The Personal System/2 Model 80 (8580-311) features the following:

- Micro Channel Architecture with a 16 and 32-bit bus
- Increased processing speed (80386 20M Hz)
- 80 nano-second memory, 1 megabit chips, up to 16Mb

- Improved multitasking and communications capabilities
- High level of graphics and text quality
- Large capacity 314Mb fixed disk drive, and 1.44Mb, 3.5-inch diskette drive
- High level of feature integration on the system board
- Ease of installation and configuration
- Auto-Restart Power Supply

Standard Features:

The following features are standard on the 8580-311:

- 80386 20Mhz 32-bit microprocessor
- 2Mb of 80ns memory on the system board
- 3.5-inch 1.44Mb Diskette Drive
- 5.25-inch 314Mb Fixed Disk Drive (23ms)
- Fixed Disk Controller Adapter (occupies one 16-bit slot)
- Integrated Diskette Controller
- Integrated Serial Port
- Integrated Parallel Port
- Integrated Video Graphics Array Port
- Pointing Device Port
- Keyboard Port
- Enhanced Keyboard with cable
- Eight I/O bus slots (Five-16 bit, Three-16/32 bit)

Physical Specifications:

Width: 165.1mm (6.5 inches)
Depth: 482.6mm (19.0 inches)
Height: 597.2mm (23.5 inches)
Weight: 23.6kg (52 lbs.)

Operating Environment:

- Ambient Air Temperature:
System on: 15.6 - 32.2C (60 - 90F)
System off: 10 - 43C (50 - 110F)
- Humidity:
System on: 8 - 80 percent RH
System off: 20 - 80 percent RH

Publications: Standard publications incorporate most operator information along with diagnostic and utility programs on the system Reference Diskette.

The following items are included with each system unit ship group:

- A Setup Sheet contains wordless instructions for setting up the system unit, keyboard and display.
- The 8580 Quick Reference Manual contains an introduction to the computer, option installation instructions, and troubleshooting instructions.
- The Reference Diskette contains a system tutorial, diagnostics and utilities.
- The Technical Directory is a listing of publications available for purchase.
- S68X-2284, (P/N 68X2284) 8580 Quick Reference Manual
- S68X-2278-00, (P/N 68X2278) 8580 Quick Reference Manual (Canadian French)

Additional copies will be available for a fee (4Q87).

- (LAD only > Spanish - P/N 95X3316 <)

The publication listed below will be available. The hardware maintenance publications are for service personnel and detail many aspects of maintaining the machine. The hardware manuals include a parts catalog, the system diskette containing advanced diagnostics, and instructions for identifying the failure of a replaceable unit.

MACHINES

- IBM Personal System/2 Model 80 (Type 8580-311) Supplements for the Hardware Maintenance Library
 - IBM Personal System Model 80 Supplements for the Hardware Maintenance Library - S68X-2304-00 (P/N 68X2304)
- (Canada only > French - P/N 95X3347 <)
- (Except Canada > Spanish - P/N 95X3368 <)
- Technical Reference Manuals
 - Technical Reference (System) - The Technical Reference Manual is for programmers, engineers, and others who want to understand the 8580 in greater detail. This reference manual includes functional specifications, hardware specifications and printouts for peripheral connectors.
- IBM Personal System/2 and Personal Computer BIOS Interface - This manual documents the BIOS interface for the Personal System/2 and IBM Personal Computers.
- Technical Reference Option Modules include the functional specifications for programmers, engineers and others who want to understand the options and adapters in greater detail.
 - TRO/A 314Mb Fixed Disk
- TRO/A 314Mb Fixed Disk - S68X-2303-00 (P/N 68X2303)
- Advanced BIOS Supplement - S68X-2288-00 (P/N 68X2288)
- Other Documentation

The installation instructions for options contain the instructions to install the option, a warranty, and where appropriate, basic operational instructions. These publications are shipped with the options.

SLSS is not available for any of the above publications. Publications that may be purchased are available through IBM, IBM Authorized Dealers, or the Technical Directory.

DESCRIPTION

The IBM Personal System/2 Model 80 (8580-311) is a high-end solution within the IBM Personal System/2 family. This floor-standing system has 2Mb of system board memory (upgradable to 4Mb) and a 314Mb fixed disk drive (upgradable to 628Mb). The 8580-311 incorporates the latest IBM and industry technologies in an innovative package, designed specifically for the business office environment.

This system unit features the Intel 80386 20MHz Microprocessor and the Micro Channel Architecture. The 80386 is partitioned into six functional units that can process multiple instructions simultaneously for improved performance. The 32-bit architecture of the microprocessor is extended throughout the 8580-311 system design, improving overall performance.

The Micro Channel Architecture supports both 16 and 32-bit Input/Output (I/O) and memory adapters. The advantages of adapter recognition (no setup switches) are offered for easy configuration, and improved diagnostic and fault isolation for better availability.

In addition to the 20MHz processor speed, the standard Page Memory Logic on the system board enhances system performance by allowing the system to operate even faster with most applications.

The system unit comes standard with:

- 2Mb of system board memory
- 1.44Mb, 3.5-inch diskette drive
- 314Mb fixed disk drive
- Disk controller adapter
- Integrated diskette controller
- Keyboard port

- Serial port
- Parallel port
- Pointing device port
- Video Graphics Array (VGA) port. This VGA port supports modes (640 X 480 graphics, 720 X 400 text), and compatibility with CGA and EGA. This high level of feature integration on the system board reduces the requirements for optional adapters.

The system has two levels of BIOS that total 128Kb. There is a compatibility BIOS (CBIOS) with memory addressability of up to 1 megabyte that provides compatible support for current application programs. An additional version of BIOS, advanced BIOS (ABIOS) has extended memory addressability (up to 16 megabytes) and provides support for multitasking operating systems.

Additional features of the system unit include:

- Eight I/O bus slots (Five - 16-bit, Three - 16/32-bit (one - 16-bit slot is occupied by the disk controller adapter))
- 225-watt universal power supply
- Time/date clock with a lithium battery
- Additional positions for a second 5.25-inch disk drive and for a second 3.5-inch diskette drive.

The 8580 supports the 8503, 8512, 8513, and 8514 analog displays that together with the VGA built-in function, provide significant enhancements to graphics and text capabilities. This ability to display more colors using larger palettes with enhanced addressability widely expands new application opportunities.

SYSTEM FEATURES

The following new option is announced to expand the base function of the 8560 and 8580.

NEW OPTION

IBM Personal System/2 314Mb Fixed Disk Drive (P/N #6450381): The 314Mb Fixed Disk Drive is available on the IBM 8580-071, 8580-111 and 8580-311. This feature attaches via the high performance Enhanced Small Device Interface (ESDI) disk drive adapter provided with the system unit and does not require an additional expansion slot. This fixed disk not only features a large storage capacity but the average seek time is 23ms, making it the fastest fixed disk in the Personal System/2 family.

Drive Specifications

- Formatted Capacity - 314Mb
- Disks - 8
- Cylinders - 1,225
- Sectors/Track - 34
- Data Bytes/Sector - 512
- Data Transfer Rate - 10.0 million bits/sec
- Average Seek Time - 23ms

Options Supported: The system supports the following announced hardware:

- IBM Personal System/2 80386 Memory Expansion Option (#3019, P/N 6450367)
- IBM Personal System/2 80386 Memory Expansion Kit (#3064, P/N 6450372)
- IBM Personal Product Monochrome Display 8503 (8503-001, 002, 003)
- Personal System/2 Color Display 8512 (8512-001, 002, 003)
- IBM Personal System/2 Color Display 8513 (8512-001, 002, 003)
- IBM Personal System/2 Color Display 8514 (8514-001, 002, 003)
- 1.44Mb Diskette Drive (#3057, P/N 6450353)
- Mouse (#8770, P/N 6450350)
- 5.25-inch External Diskette Drive Adapter/A (#8760, P/N 6450245)
- 3117 Adapter/A (#1029, P/N 65X1925)
- High Speed Adapter/A (#1028, P/N 65X1905)

MACHINES

- 6157 Tape Drive Adapter (#4160, P/N 92X1458)
- Display Adapter 8514/A (#4054, P/N 1887972)
- 8514 Memory Expansion Kit (#4081, P/N 1887989)
- 70Mb Fixed Disk Drive (#3051, P/N 6450355)
- 115Mb Fixed Disk Drive (#8730, P/N 6450377)
- Dual Async Adapter/A (#3033, P/N 6450347)
- Multi-Protocol Adapter/A
- The IBM 3270 Connection (#2000, P/N 83X9702)
- IBM System 36/38 Work Station Emulation Installation Convenience Kit Version 1.0 (#6287, P/N 69X6287)
- IBM System 36/38 Work Station Emulation Adapter (#6292, P/N 69X6292)
- PC Network Baseband Adapter/A (#1223, P/N 1501223)
- PC Network Adapter II/A (#1222, P/N 1501222)
- IBM Token-Ring Network Adapter/A (#4790, P/N 69X8183)
- 300/1200 Internal Modem/A (#0349, P/N 6450349)
- IBM Internal Optical Disk Drive (#8700, P/N 63X4166)
- IBM 3363 Optical Disk Drive
- ROLMphone 244PC (#46900)

CABLES

- IBM Serial Adapter Cable (#0217, P/N 6450217)
- IBM Serial Adapter Connector (#0242, P/N 6450242)
- IBM Communications Adapter Cable (#2067, P/N 1502067)
- IBM Printer Adapter Cable (#5612, P/N 1525612)
- IBM Token-Ring PC Adapter Cable (#3390, P/N 6339098)
- IBM PC Network Baseband Adapter Cable (#1229, P/N 1501229)
- IBM Cabling System PC Network Baseband Network Baseband Cable (#2067, P/N 1502067)

ACCESSORIES

- Data Migration Facility (#5003, P/N 1501224)

Input/Output Devices Supported:

Displays:

- (Canada only) > 8503 Monochrome Display Model 001
- 8512 Color Display Model 001
- 8513 Color Display Model 001
- 8514 Color Display Model 001 <

Printers:

- 3812 Model 1 Page Printer
- 3852 Model 2 Color Jetprinter
- 4201 Model 1 Proprinter
- 4201 Proprinter II
- 4202 Model 1 Proprinter/XL
- 4207 Proprinter X24
- 4208 Proprinter XL24
- 5201 Model 1 Quietwriter
- 5201 Model 2 Quietwriter
- 5216 Model 2 Wheelprinter
- 5223 Model 1 Wheelprinter E
- 5202 Quietwriter III

Plotters:

- IBM 6180 Color Plotter
- IBM 6184 Color Plotter
- IBM 6186 Model 1, 2 Color Plotter
- IBM 7372 Color Plotter
- IBM 7374 Color Plotter
- IBM 7375 Model 1, 2, Color Plotter

Scanners

- IBM 3117 Scanner
- IBM 3118 Scanner

Tape

- IBM 6157 Streaming Tape Drive

Other Devices

- IBM 4869 5.25-inch External Diskette Drive
- IBM 3363 Optical Disk Storage Unit (A11, B01)
- ROLMphone 244PC (#46900)

Cables

- 3005 IBM PC Cable
- 6293 IBM System 36/38 Work Station Emulation Cable

SUPPLIES

3.5-inch, 2.0Mb Diskette (#6404078)

8775 DISPLAY TERMINAL

PURPOSE

A high function cathode ray tube display terminal provides a means of entering data to or receiving data from the 4300, 9370, S/370 Processor or the 8100 Information System.

APL, field and character highlighting, field validation, multiple partitions, scrolling, programmed symbols, extended data entry capabilities and facilities for entry and edit of text are available. A Keyboard or a Selector Light-Pen permit an operator to display and manipulate data on the screen in a flexible and efficient manner. Other functions include Audible Alarm, Security Keylock, Printer Adapter and Magnetic Slot Reader or Magnetic Hand Scanner. The 8775 meets both general and unique display requirements with its set of basic and optional features.

MODELS

Loop Attach on the 4331 Processor Mdl Group 1 and 2 or 8100 System.

Model 1 001: Displays 960, 1,920 or 2,560 characters in the 9x16 character matrix size.

Model 2 002: Displays 960, 1,920, 2,560 in the 9x16 character matrix size or 3,440 characters in the 9x12 character matrix size.

SNA/SDLC data link attach over communication facilities to a 4300, S/370 or 8100.

Model 11 011: Displays 960, 1,920 or 2,560 characters in the 9x16 character matrix size.

Model 12 012: Displays 960, 1,920 or 2,560 characters in the 9x16 character matrix size or 3,440 characters in the 9x12 character matrix size.

Note: The 8775 can only display characters within the matrix sizes. The row/column sizes are:

Characters	Row/Column
960	12x80
1920	24x80
2560	32x80
3440	43x80

This applies to all models.

Customer Setup (CSU): Machine only.

HIGHLIGHTS

Displays 960, 1,920 or 2,560 characters in a 9x16 character matrix, or 3,440 characters in a 9x12 character matrix. (Mdl 2 and 12 only.)

The number of characters displayed is determined under operator control. All configurations include 62 alphameric and 32 special characters, the Space, and Null characters. Use of 3270 Field Formatting capability permits individual fields of data on the screen to be program defined with various attributes such as protected/ unprotected, alphameric/numeric, normal/highlighted intensity, displayable/non-displayable, and selector light-pen detection allowed/disallowed.

The 8775 Display Terminal communicates with a 4321, 4331, 8130, 8140 or 8150 using Synchronous Data Link Control (SDLC) over either direct or data link attach loops or with an 8130, 8140, 8150, 4300 or S/370 processor via data link attach over communication facilities. The basic 8775 offers equivalent function and is upward data stream compatible with the 3276/3278.

Downstream loadable function which includes APL, field and character highlighting, field validation, enhanced function with magnetics, multiple partitions, scrolling, and text entry and edit is optionally available. The Enhanced Function, Enhanced Function with Magnetics, and Multiple Partitions and Scrolling features, and the Interactive Display Text Facility (IDTF) licensed program consist of four sets of data contained on magnetic media. Only one set can be loaded into an 8775 at a given time. The Interactive Display Text Facility (IDTF) licensed program is on separate magnetic media supplied by IBM program libraries.

The Printer Adapter provides the capability to print either the screen contents or bulk data from the host. This feature is mutually exclusive with any of the downstream loadable function. One of the following printers may be attached: 3230 mdl 2, 3262 mdl 13, 3268 mdl 2, 3287 mdl 1, 2, 1C, or 2C, 5210 mdl G01, G02 or 7436 mdl 1.

Operator Factors: 8775 has an anti-reflective screen. Indicators are displayed on the bottom row of the screen, outside the data display area, and provide useful operator information. Updating the screen from the host is accomplished without refresh interrupt (i.e., no blinking). The keyboard, which is low in profile, provides a palm rest area and has separators to help prevent accidental striking of control keys. The operator may select one of several cursor modes.

Editing Facilities: Cursor move, tab, home key, back tab, insert, delete, extended erase (erase to end-of-field, erase all keyboard input data, and erase entire screen) and cursor select keys are all basic. All alphameric, special symbol, and cursor move keys have typamatic capability. Double speed cursor typamatic is attained with a simultaneous depressing of the ALT key and a horizontal cursor positioning key. The cursor select function provides an alternative to the Selector Light-Pen function. Fields of data may be selected by positioning the cursor then using the Cursor Select Key.

Input Flexibility: A choice of keyboards or the Selector Light-Pen provide input flexibility -- see "Special Features" below. Fields of data can be selected by positioning the cursor and operating the cursor select key, instead of using the Selector Light-Pen. 12 Program Function (PF) keys are basic with all typewriter keyboards; seven or more PF keys are available on all Data Entry Keyboards.

Security Facilities: A special non-displayed input mode provides for fields of data to be program-defined so that they will accept data entered from the keyboard without displaying the data on the screen. A Security Keylock (optional) prevents modification or display of data in the display buffer unless the key is turned to the "on" position. The Setup Keylock (optional) controls access via the keyboard to change the terminal address. Those capabilities and the terminal's ability to identify itself to the host program, allow customer-supplied security program routines to control access to data and to record an audit of actions. A Magnetic Slot Reader or Magnetic Hand Scanner is available to enter system user identification.

Communications: The 8775 mdl 1, 2 display terminals are attached to customer-owned loops. A direct loop to a 4331 Mdl Group 1 and 2 or 8100 processor may operate at 38.4K bps, or 9600 bps, this operating speed being determined by the customer at order time. A data link-attached loop may be connected to an 4331 or an 8100 System via a 3843 Loop Control Unit. The 3843 provides an interface to a synchronous modem transmitting at 2400, 4800 or 9600 bps. The Loop Control Units support point-to-point or multipoint telecommunication links. Half-speed operation of the 8775 can be selected by the operator. Refer to the M3843 pages for more information.

The 8775 mdls 11, 12 may communicate to an 8100 Information System over data link nonswitched communication facilities or to a 4331 Processor via its Integrated Communications Adapter or to a 4300 and S/370 Processors via 3704, 3705 or 3725 Communication Controller over data link nonswitched, nonswitched with switched network backup or public switched network communication facilities using Synchronous Data Link Control (SDLC).

Modems: A 1200 bps Integrated Modem feature (#5500) or an external IBM modem may be attached to an 8775 mdl 11, 12. External modems require the external modem interface (#3701).

3863-1/2	2400/1200	Nonsw/Sw voice gr
3864-1/2	4800/2400	Nonsw/Sw voice gr
3865-1/2	9600/4800	Nonsw
3868-1	2400/1200	Nonsw
3868-2	4800/2400	Nonsw
3868-3/4	9600/4800	Nonsw
3976-3	1200/600	Nonsw/Sw voice gr
3872-1	2400/1200	Nonsw/Sw voice gr*
5979-L41	9600	Ltd distance COAM
		* Canada only

4-wire Switched Network Backup is available on 3863, 3864 and 3865 modems.

Switched Network backup operation with Manual Call and Manual or Auto Answer is available on the 3872 mdl 1.

For communication capabilities, product utilization and special features, see the M2700 pages and appropriate modem pages for additional information.

Keyboards: Refer to Type Catalog for a picture of the keyboard layouts. Contact IBM for RPQ keyboard descriptions.

Limitations, All Keyboards: Keyboards used on 3275, 3276, 3277, 3278 or 3279 machines are not interchangeable with keyboards used on 8775 machines. Maximum: One. Field Installation: Yes. The keyboard is setup by the customer, except when a change in keyboard requires a change in national keyboard language. A 0.9m (3 ft) keyboard cable is standard. Prerequisites: Keyboard language, see "Specify".

Attachment Features: Each 8775 mdl 1 or 2 must be equipped with a loop adapter which provides the capability to attach to a direct or data link attached loop of the 4331 Processor or the 8100 System.

Telecommunications: Each 8775 mdl 11 or 12 must be equipped with one of the following communication features: External modem interface (#3701), CCITT V.35 interface (#1550), X.21 Adapter (#5655) or 1200 bps integrated modem (#5500).

Display Station Keyboard Accessories: Keyboard accessories allow customers to define and change the messages on single position keytops of the 8775 keyboard. These accessories supply keytops only and do not change any characters or functions of the display station. The accessories consist of legendable keytops, blank keytops for customer engraving and a keytop extractor.

These accessories may be ordered from IBM.

Problem Determination Procedures: Significant function has been designed into this unit to provide greater availability to the customer. This has been done through the use of the problem determination and recovery routines and procedures that are easily understood and used by the operator. See "Customer Responsibilities" below.

Communication network management problem determination support for 4331 Mdl Group 1 and 2 loop attached 8775s is provided via NCCF/NPDA.

Customer Setup (CSU): 8775 is designated Customer Setup, thereby offering customers ease of setup and relocation flexibility.

One copy of the CSU instructions, "Problem Determination Guide", and Trouble Report form are provided with each 8775. If additional copies are required, they should be ordered separately through the Branch Office.

Customer Responsibilities: The customer is responsible for:

- Adequate site, system and other vendor preparation.
- Receipt at customer's receiving dock, unpacking and placement of 8775 display terminal.

- Physical setup, connection of cables incorporating protected customer access areas, and check-out.
- Contacting CE to make cable connections of IBM CSU units to non-CSU units where customer access area is not provided.
- Notifying IBM of intent to relocate and follow IBM instructions for relocation.
- Use and follow the problem determination procedures and fill out trouble report prior to calling for IBM service.
- Disconnecting, packing and removal to the customer's shipping dock at the time of discontinuance; appropriate instructions will be provided by IBM.
- Procurement, installation and maintenance of the loop network, see "Accessories".
- Performing 8775 Customization if required in accordance with IBM-supplied procedures.
 - For initial setup
 - Updating of the 8775 diskettes (at customer option)

Bibliography: Refer to "An Introduction to the IBM 8775 Display Terminal", GC33-3040.

SPECIFY

Unless indicated otherwise, these specify features are only available at time of manufacture.

- Power (AC, 1-phase, 50/60 Hz): Specify #2998 and one of the following: #2804 for input voltages between 100 volts and 120 volts. If 127V is required, specify #2820. Specify #2806 for input voltages between 200 volts and 230 volts. If 240V is required, specify #2801.

For Canada only, specify #2804, #2998 and #9890 for locking plug or #9891 for nonlocking plug (both at 60 Hz, 120V, 1-phase).

For Japan only, specify #2998 and #9890 for locking plug or #9891 for nonlocking plug for voltages under 200 volts.

Plugs: The 3-digit country code (except Canada and Japan) on the DP machine order sheet will be used to select a power plug which matches the most commonly used power supply in each country, if an exception is required, a country RPQ may be initiated.

If a power supply, not the most commonly used, is specified, and it is not compatible with the power plug commonly supplied, a power cord without plug will be shipped unless the country RPQ referred to above is initiated. In this case, the machine shipped without a plug is not considered a machine defect.

If standard 2.8m (9.0 ft) power cable is not desired, specify: #9513 for 4.5m (15.0 ft) cable.

- Attachment: Specify the following:
 - #9221 for attachment to the 8130 Information System
 - #9222 for attachment to the 8140 Information System
 - #9226 for attachment to the 8150 Information System
 - #9227 for attachment to a 4321 Processor
 - #9223 for attachment to a 4331 or 4361 Processor
 - #9224 for attachment to a 4341 and 4381 Processor
 - #9225 for attachment to a S/370 processor
- Distribution of Magnetic Media for Enhanced Function (#3624), Enhanced Function with Magnetics (#3626) or Multiple Partitions and Scrolling (#5110).

If Enhanced Function Feature (#3624), Enhanced Function with Magnetics (#3626) or Multiple Partitions and Scrolling (#5110) is ordered, one copy of magnetic media is needed per system, therefore, specify:

- #9491 - For one 8775 on each system
- #9492 - For all other 8775s on each system

Note: For each system with one or more 8775s (with #3624, #3626 or #5110) attached, one and only one 8775 should specify #9491. Care should be exercised when relocating 8775s, that this relationship is maintained.

If #9491 is specified, also select #9425 Diskette 2D for the 8100 System, #9412 for 9/800 magnetic tape, #9413 for 9/1600 magnetic tape or #9414 for 9/6250 for magnetic tape for 4300 or S/370 Processor to identify the type of magnetic media. Additional shipping instructions are also required.

- **Licensed Programming:** Specify #9600 if the Interactive Display Text Facility (IDTF) licensed program is to be used on this machine. Prerequisites: #3623, #3905, (Japan only > #2714 or #4670, <) #5781, #3624, #3626 and #5110. These provide the necessary configuration to enable the IDTF licensed program to be loaded into the terminal.

Note: The feature codes #3624, #3626, #5110 and #5781 are necessary to enable correct order processing. However, the functions provided by these features cannot be operational when the IDTF licensed program is loaded into the terminal. The IDTF licensed program is distributed on a separate diskette. If required, it must be ordered separately (see Program Product pages).

Specify address for distribution of magnetic media for a new 8775:

Line 1 - C/O IBM (Country) Distribution Center
Line 2 - Street Address (or P.O. Box)
Line 3 - City, Country, Postal Code

Specify #9596 if magnetic media is to be shipped to an address other than site address of 8775.

Specify address for distribution of magnetic media for engineering changes or MES orders:

Line 1 - C/O IBM EC Point of Control
Line 2 - Street Address (or P.O. Box)
Line 3 - City, Country, Postal Code

- **Communication Cable:** A 1.8m (6.0 ft) communication cable is provided for attachment to a direct or data link attached loop. If 1.8m cable is not desired, specify #9405 for 4.3m (14.0 ft) cable.

A 6.1m (20.0 ft) communication cable is provided as standard for attachment to stand-alone modems or to the communication facility when an integrated modem is used or to a communication facility when an X.21 adapter is used. If the standard communication cable is not desired, specify #9061 for 3m (10 ft) cable, #9062 for 9.1m (30 ft) cable or #9063 for 12.2m (40 ft) cable.

- **Machine Nomenclature:**

#2924 for English US
#2930 for Japanese
#2931 for Spanish Speaking
#2935 for Canadian French*
#2938 for Brazilian

* Canada must always specify #2935.

- **Character Set Language:**

Brazilian	#2775
Canadian English	#2778
Canadian French	#2777
English UK	#2758
English US	#2756
EBCDIC	#2751
International	#2750
Japanese English	#2755
Japanese Katakana	#2773
Spanish Speaking	#2769

Katakana Support: 127-Character (plus Space and Null) support is an enhancement of previously announced 3270 Japanese Katakana. This enhancement may not be 3270 compatible for customers using the NL and EM codes. Customers who do not use the NL and EM codes will be 3270 compatible. For details, see appropriate publications.

- **Keyboard Language:** When ordering keyboard, also specify one of the following:

Brazilian	#2975 (3)
Canadian English	#2978 (4)
Canadian French	#2977
English UK	#2958 (4)
English US	#2956
EBCDIC	#2951 (3)
International	#2950 (3)
Japanese English	#2955 (1)
Japanese Katakana	#2973 (2)
Spanish Speaking	#2969 (3)

1. Japanese English #2955 applies only to keyboards #2715, #2717, #2718, #2719, #4622, #4623.
2. Japanese Katakana #2973 applies only to keyboards #2714, #2715, #2716, #2717, #2718, #2719.
3. Brazilian #2975, EBCDIC #2951 and International #2950 do not apply to keyboard #4670.
4. Canadian English #2978 and English UK #2958 apply to keyboard #4670 only.

Limitations: The Keyboard Language must conform to the Character Set Language (see "Specify").

SPECIAL FEATURES

Setup Keylock (#1009): Controls access to change the unit address of the terminal. Maximum: One. Field Installation: Not recommended.

Audible Alarm (#1090): An alarm sounded under program control, to alert the operator to a special condition. This alarm during keyboard operation is also sounded when a character is entered into the next-to-last position on the screen. The operator may adjust the volume of the tone. Maximum: One. Field Installation: Yes.

Business Machine Clocking (#1488): Required for attachment of 1200 bps Integrated Modem (#5500) or any external modem that does not provide its own clocking and operates at 1200/600 bps. Maximum: One. Field Installation: Yes.

CCITT V.35 Interface (#1550): (8100 attached only) Provides a CCITT V.35 interface for direct connection up to 1,000 feet operating without a modem. Speeds of 600, 1200, 2400, 4800 and 9600 bps are supported. Business Machine Clocking (#1488) is not required. Limitations: Cannot be installed with #4850, #3701, #5500, or #5655. Maximum: One. Field Installation: Yes on mdls 11 and 12.

(Japan only > 88-Key Jap. Eng. T/W Text Entry and Edit KB (#2714): Provides all the character and function keys of an 88-Key Japanese English Typewriter keyboard with additions for entry and edit of text. The group of 12 PF keys to the right of the main keyboard has special narrow keytops to accommodate an IBM-supplied reversible annotated overlay. One side of the overlay indicates the function key assignments when the 8775 is being used for text applications. The other side of the overlay indicates the function key assignments for data applications. These data assignments are the same as those of the 88-key Japanese keyboard (#2717). A different color keytop marking is used to highlight those graphics, symbols and controls that are only active when IDTF licensed program is downstream loaded and the display terminal is in the text state. The keyboard does not provide the ability to enter APL characters. Prerequisite: #2955. Note: One keyboard overlay is supplied with each keyboard. Additional overlays can be obtained via MES.

76-Key Jap. Eng./Jap. Kat. T/W K/B (#2715): Typewriter-like layout, movable. 12 PF keys are available in the top row of data keys through use of an alternate shift key. The 76-key Japanese English Typewriter Keyboard provides 49 data keys and 27 control keys. Limitations: Monocase Switch #4944 is not available with the Katakana keyboard language #2973. Prerequisites: #2955 or #2973.

76-Key Japanese Katakana Data Entry Keyboard (#2716): Movable, 4-level shift providing 49 data keys, 10 PF keys and 27 control keys. Limitations: Monocase Switch #4944 is not available with this keyboard. Prerequisites: #2973.

88-Key Jap. Eng./Jap. Kat. T/W K/B (#2717): Typewriter-like layout, movable, with 49 data keys, 26 control keys and 12 PF (total 24 PF keys). 12 of the PF keys are available in the top row of data keys through the use of the alternate shift key. The Japanese Katakana keyboard provides 4-level shift, 49 data keys and 27 control keys. Limitations: Monocase Switch #4944 is not available with the Katakana keyboard language #2973. Prerequisites: #2955 or #2973.

88-Key Jap. Eng./Jap. Kat. T/W/APL K/B (#2718): 88-key Japanese English/Japanese Katakana typewriter keyboard (see #2717) with modified keytops to allow entry of 81 APL specific characters in addition to the basic character set (Japanese English or Japanese Katakana per Keyboard Language Specify). An APL On/Off key controls whether the keyboard is in APL or basic character set mode. In contrast to the 88-key JE/JK typewriter keyboard without APL (see #2717), this keyboard has only 12 PF keys (PF1 through PF12) which are the group of 12 keys to the right of the main keyboard area. Limitations: Monocase Switch #4944 is not available with the Katakana keyboard language #2973. Prerequisites: #3624 or #3626 and #2955 or #2973.

88-Key Jap. Eng./Jap. Kat. T/W/Overlay KB (#2719): This keyboard, without an overlay has the same layout and can be used in the same way as the 88-key Japanese English/Japanese Katakana Typewriter Keyboard #2717. This keyboard, however, has special narrow keytops which permit the use of customer annotated overlays. These overlays are used to show the symbols associated with the keys when one of the Programmed Symbols (PS-A through PS-F) is selected. The desired PS can be selected by the operator through use of the appropriate PF keys in upper case and alternate shift on this keyboard. Limitations: Monocase Switch #4944 is not available with the Katakana keyboard language #2973. Prerequisites: #2955 or #2973. Note: Two keyboard overlays are supplied with each keyboard. Additional overlays may be obtained via MES, see "Accessories".<)

Extended Feature Storage (#3623): Provides the storage capacity required for Enhanced Function (#3624), Enhanced Function with Magnetics (#3626), Multiple Partitions and Scrolling (#5110) or the IDTF licensed program. Limitation: Cannot be installed with #5580. Maximum: One. Refer to "Specify" for information on the shipment of the magnetic media to the proper location. Field Installation: Yes.

Note: The Enhanced Function, Enhanced Function with Magnetics, and Multiple Partitions and Scrolling features, and the IDTF licensed program, consist of four sets of data contained on magnetic media. Only one set can be loaded into the 8775 at a given time. If Enhanced Function with Magnetics (#3626) is installed then Enhanced Function Feature (#3624) or Multiple Partitions and Scrolling (#5110) may be loaded by the operator if required. If Enhanced Function (#3624) is installed then Enhanced Function with Magnetics (#3626) or Multiple Partitions and Scrolling (#5110) may be loaded by the operator if required.

Enhanced Function (#3624): Provides the ability to display APL characters, to highlight data, display data in user-defined partitions and to validate data fields as they are entered into the display terminal from the operator keyboard. Highlight is on a per character basis in one of three user selectable modes, blink, reverse video or underscore, and, additionally, on a field basis for intensity. Partitioning provides the ability to display data in up to eight user defined rectangular partitions and for the host or user to interact individually with the data within each partition. APL provides the ability to display the space (blank), and the unique characters consisting of 94 EBCDIC, 81 APL specific, 37 characters unique to 3270 text and 10 new graphic characters.

Validation provides:

- **Mandatory Enter:** Data must be entered into this field to permit entry to the host.
- **Mandatory Fill:** All positions in this field must be filled to permit entry to the host.
- **Trigger Field:** Causes the contents of the field to be sent from the display when data has been entered into the field and the cursor leaves the field.

Maximum: One. Field Installation: Yes. Prerequisites: #3623, #3905 and either #9491 or #9492. If APL is used, 87-key APL Typewriter Keyboard (#4626), or 88-key JE/JK APL Typewriter Keyboard #2718 is required. If keyboard selectable highlighting is desired, 87-key keyboards (#4626, #4627, #4640 or #4670) or 88-key Japanese (#2717, #2718 or #2719) are required.

Enhanced Function With Magnetics (#3626): Provides the function of the Enhanced Function Feature (#3624) with the addition of the ability to read via a magnetic slot reader, dual entry magnetic slot reader or magnetic hand scanner, magnetically encoded information from alphanumeric character set. Maximum: One. Field Installation: Yes. Prerequisites: #3905, #3623 and either #9491 or #9492. If APL is used, 87-key APL typewriter keyboard (#4626) or 88-key JE/JK APL typewriter keyboard (#2718) is required. If Keyboard selectable highlighting is desired 87-key keyboards (#4626, #4627, #4640 or #4670) or 88-key Japanese (#2717, #2718 or #2719) is required.

External Modem Interface (#3701): Provides EIA RS-232-C CCITT V.24/V.28, CCITT X.21bis V.28 interface and appropriate code to attach either an external IBM modem or PTT-mandatory modem. Refer to M2700 pages. Other external non-IBM modems may be attached subject to the IBM Multiple Supplier Systems Bulletin. Provides X.21bis interface for attachment to nonswitched and switched data network. In Japan, Interface Test #2946 is required for non-IBM modems.

Supports speeds of 600, 1200, (Canada only >2000, <) 2400, 4800, 7200 and 9600 bps over nonswitched and switched facilities. Also supports direct connection to 8100 Information System or 4331 Processor. Limitations: Cannot be installed with: #4850, #1550, #5500 or #5655. Business Machine Clocking (#1488) required for those modems which do not provide their own clocking. Maximum: One. Field Installation: Yes on mdls 11 and 12. Specify: #9493 for operation on public switched network (not available with #9221, #9222) or #9494 for operation on nonswitched communication facilities.

Feature Adapter (#3905): Provides the logic necessary to perform Enhanced Function, Enhanced Function with Magnetics, or to execute IDTF. Maximum: One. Field Installation: Yes. Prerequisites: #3624 and/or #3626 and/or #9600.

75-Key Typewriter Keyboard (#4621): Typewriter-like layout, movable, with 49 data keys and 26 control keys. 12 PF keys are included in the top row of data keys through use of an alternate shift key. Prerequisites: Keyboard language, see "Specify".

75-Key Data Entry Keyboard (#4622): Movable with 35 data keys, 10 PF keys and 30 control keys. Prerequisites: Keyboard language, see "Specify".

75-Key Data Entry Keyboard (#4623): Keypunch layout, movable, with 35 data keys, 10 PF keys and 30 control keys. This is the recommended keyboard for high volume data entry. Prerequisites: Keyboard language, see "Specify".

87-Key EBCDIC Typewriter/APL Keyboard (#4626): 87-key EBCDIC typewriter keyboard (ref #4627) with modified keytops to allow entry of 81 APL specific characters in addition to the 94-character EBCDIC set. An APL On/Off key controls whether the keyboard is in basic EBCDIC typewriter or APL mode. In contrast to the 87-key EBCDIC typewriter keyboard without APL (see #4627), this keyboard has only 12 PF keys (PF1 through PF12) which are the group of 12 keys to the right of the main keyboard area. Prerequisites: #3624, #3626. Keyboard language, see "Specify".

87-Key EBCDIC Typewriter Keyboard (#4627): Typewriter-like layout, movable, with 49 alphameric data keys, 26 control keys and 12 PF keys (24 total PF keys). 12 of the PF keys are included in the top row of the data keys through the use of an alternate shift key. Prerequisites: Keyboard language, see "Specify".

87-Key EBCDIC Typewriter Overlay Keyboard (#4640): This keyboard without an overlay has the same layout and can be used in the same way as the 87-key EBCDIC Typewriter Keyboard (#4627) with the 94-character EBCDIC character set. This keyboard, however, has special narrow keytops which permit the use of customer annotated overlays. These overlays are used to show the symbols associated with the keys when one of the Programmed Symbols (PS-A through PS-F) is selected. The desired PS can be selected by the operator through use of the appropriate PF keys in upper case and alternate shift on this keyboard. Prerequisite: Keyboard language, see "Specify". Note: Two keyboard overlays are supplied with each keyboard. Additional overlays may be obtained via MES, see "Accessories".

87-Key EBCDIC Typewriter/Text Entry And Edit Keyboard (#4670): Provides all the character and function keys of an 87-key EBCDIC Typewriter Keyboard with additions for entry and edit of text. The group of 12 PF keys to the right of the main keyboard area has special narrow keytops to accommodate an IBM supplied reversible annotated overlay. One side of the overlay indicates the function key assignments when an 8775 is being used for text applications. The other side of the overlay indicates the function key assignments for data applications. These data assignments are the same as those of the 87-key EBCDIC Typewriter Keyboard (#4627). The keyboard also allows entry of additional graphics and text control characters including the characters available on the IBM 3732 Text Display Station. A different color keytop marking is used to highlight those graphics, symbols, and controls that are only active when the IDTF licensed program is downstream-loaded and the display terminal is in text state. The keyboard does not provide the ability to enter APL characters. Prerequisites: Keyboard language, see "Specify". Note: One keyboard overlay is supplied with each keyboard. Additional overlays can be obtained via MES, see "Accessories".

Limitations: Keyboards used on 3275, 3276, 3277, 3278 or 3279 machines are not interchangeable with keyboards used on 8775 machines. Maximum: One of each of the above. Field Installation: Yes. The keyboard is setup by the customer, except when a change in keyboard requires a change in national keyboard language. A 0.9m (3.0 ft) keyboard cable is standard. Prerequisites: Keyboard language (see "Specify").

Keyboard Numeric Lock (#4690): Provides the ability to lock the keyboard, if a non-numeric key (other than 0-9, minus, decimal sign, or dup) is depressed in a pre-defined numeric-only field. Maximum: One. Field Installation: Yes.

Loop Adapter (#4850): Provides the capability to attach to a direct- or data link-attached loop of a 4331 Processor or the 8100 System. Direct loop may operate at a data rate of 38.4K bps or 9600 bps. The data link-attached loop operates at a data rate of 2400, 4800 or 9600 bps. The Loop Adapter operating data rate of 2400, 4800, 9600 or 38.4K bps is specified by the customer at order time. Half-speed operation of the 8775 can be selected by the operator. Data link attached loops are connected to a 4331 Processor and to an 8100 processor via a 3843 Loop Control Unit. Specify: On initial order or by change by service representative.

#9829 for 38.4K bps
#9825 for 9600 bps
#9823 for 4800 bps
#9822 for 2400 bps

The data rate of a loop cannot be higher than that of the slowest device attached to the loop. Consideration should be given to attaching devices slower than the 8775 on a separate loop when the maximum data rate of the 8775 is required. Maximum: One.

Monocase Switch (#4944): Provides the choice to display either uppercase characters only or both uppercase and lowercase characters. Does not apply to keyboard #2716 or keyboards #2715,

#2717, #2718 or #2719 with Katakana language #2973 specified. Maximum: One. Field Installation: Yes.

Magnetic Reader Control (#4999): Provides the capability of attaching a Magnetic Slot Reader, Dual Entry Magnetic Slot Reader or Magnetic Hand Scanner, which reads encoded information from a magnetic stripe. Maximum: One. Field Installation: Yes.

Multiple Partitions And Scrolling (#5110): Multiple partitions provides the ability to display data in up to eight user defined rectangular partitions and for the host or user to interact individually with data within each partition. Scrolling provides the ability with any designated partition for user interaction with data record longer than provided for by the physical size of the visible portion of that partition. The operator controls the movement of data either up or down through the use of Scrolling control keys located on the keyboard. An additional scrolling buffer of a maximum of 58 lines of 80 characters wide (4,640 characters) is provided. The actual scrolling capability is dependent upon screen/partition configuration. Maximum: One. Field Installation: Yes. Prerequisites: #3623 and either #9491 or #9492.

IBM 1200 bps Integrated Modem (#5500): Provides an integrated modem at speeds of 1200/600 bps for operation over nonswitched communication facilities. No external modem is required. Limitations: Cannot be installed with #3701, #4850, #1550, or #5655. Maximum: One. Field Installation: Yes on mdls 11 and 12. Prerequisites: #1488. Specify: #9651 for use with 4-wire facility or #9652 for use with 2-wire facility (Japan only) and #2943 if used on NTT D-1 service (<).

Printer Adapter (#5580): This adapter provides an interface which enables one of the following printers to be attached: 5210 mdls G01, G02, 3230 mdl 2, 3262 mdl 13, 3268 mdl 2, 3287 mdls 1, 2, 1C, 2C, 7436 mdl 1. The user has the following print facilities. Local Copy printing in which a copy of the screen contents is printed on the attached printer, this can be initiated either by the operator or the host. Bulk printing controlled by the host processor or the use of both local copy and bulk printing in shared mode. Limitations: Cannot be installed with #3624, #3626, #5110 or #9600. Maximum: One. Field Installation: No.

X.21 Adapter For Nonswitched Networks (#5655): Provides an interface and cable for attachment to the X.21 nonswitched Data Circuit-Terminating Equipment (DCE) complying with CCITT recommendation X.21. See "Specify" for length of communication cable supplied. SDLC transmission at speeds of 2400 bps #9822, 4800 bps #9823 and 9600 bps #9825 are supported. Limitation: Cannot be installed with #1550, #3701, #4850, #5500, #5650 or #5651. Maximum: One. Field installation: Yes on Mdls 11 and 12.

Programmed Symbols (PS) (#5781, #5782): When used with Enhanced Function (#3624), or Enhanced Function with Magnetics (#3626), these features provide the storage and accessing of up to six 190 symbol sets whose shapes and codes are customer definable. Symbol sets are loaded under program control and accessed for display through programming or by an operator from the display keyboard. The number of symbols in any one set that can be accessed from the display keyboard is equal to the number of characters in the base character set which is 94, 116 for Canadian French only or 127 for Japanese Katakana, plus space.

PS-2 (#5781) provides PS control and two 190-symbol sets. Prerequisites: #3624 and/or #3626.

PS-4 (#5782) provides PS control and four 190-symbol sets. Prerequisites: #5781.

When used with #9600 it provides the additional storage required by IDTF licensed program for text characters and control symbols. Maximum: One of each. Field Installation: Yes. Prerequisites: If display operator access to PS is required, select one of the following keyboards: 87-key EBCDIC typewriter overlay (#4640), 88-key Japanese English/Japanese Katakana typewriter/overlay (#2719).

Security Keylock (#6340): A lock and key which prevents modification or display of data in the display terminal when in the "off" position. Maximum: One. Field Installation: Not recommended.

Selector Light-Pen (#6350): A hand-held, pen-like device which permits the operator to select fields of data from a display for input into the host system. The Selector Light-Pen, while not being used, can be placed in a recess of the keyboard which is used for user's incidental items. Selector Pen (and Cursor Select) operations include a new designator character "&". When this designator is used, the Read Modified operation results in the return of both the addresses and the data of all modified fields on the screen. Maximum: One. Field Installation: Yes.

MODEL CONVERSIONS

Model changes from 1 to 2 and 11 to 12 are field installable.

ACCESSORIES

The following items are available on a purchase-only basis. Order the feature number as shown below.

Battery, Lithium (P/N 6042018): This supply item is a 3.0 volt non-rechargeable lithium battery which provides power to sustain the customer setup information in the 8775 when normal power is not present. Field Installation: Yes, by customer. Note: Discharged batteries should be returned to IBM for disposal, return information is printed on the label. Ordering Information: Contact IBM.

Legendable Keytop: The legendable keytop consists of two parts: A molded key base and a clear plastic cover. The user may define unique keytop messages by writing on a piece of paper, affixing the paper to the keytop base and sliding on the clear plastic cover. The keytop is available in three colors and with top keyboard row contour only. (Example: Clear Key)

Legendable Keytops	P/N
White	5188775
Charcoal Gray	8627192
Light Gray	8542831

Blank Keytop: The blank keytop is for a customer to engrave with desired nomenclature. The keytop comes in three colors and is available with top keyboard row contour only. (Example: Clear Key)

Blank Keytops	P/N
White	1853775
Charcoal Gray	1853567
Light Gray	1853563

Keytop Extractor (P/N 9900373): The keytop extractor is a small tweezer-like device which fits between the keytops. With a firm squeezing grip on a keytop, the keytop can be pulled of its stem. The customers should use the extractor whenever a keytop is to be removed from a keyboard.

Keyboard Overlay: A keyboard overlay is available on which customer-defined Programmed Symbols can be annotated. An annotated overlay can be placed over the narrow keytops of Overlay keyboards to associate specific keytops with specific symbols.

88-Keyboard Overlay: P/N 1742781
Keyboard Overlay (P/N 1742762) for the 87-key EBCDIC Typewriter Overlay keyboard (#4640)

Note: A Keyboard overlay is available for the 87-key EBCDIC Typewriter/Text Entry and Edit Keyboard (Except Japan > #4670.<) (Japan only > #4670, and for the 88-key Japanese English Typewriter/Text Entry and Edit Keyboard #2714.<) The overlay is reversible and is annotated on both sides. These overlays are available by ordering part numbers as follows:

P/N 4422225: Canadian French
P/N 4422226: English US, English UK Canadian English, and Japanese English
P/N 4422232: Spanish Speaking

Display Station Tilt/Rotate Accessory (P/N 4422265): An accessory which fits under the display station and provides a ball and socket type movement to allow the angle of the screen face to be adjusted for comfort of viewing position. The screen angle is normally 20 degrees from the vertical but with this device it can be adjusted between 25 degrees to the vertical and the vertical position. A locking device is provided to maintain the selected position. This accessory also allows the display station to be rotated plus or minus 90 degrees from the central position and this movement is independent of the tilt movement. Ordering Information: For the countries in which it is released, the Tilt Rotate Accessory is an NDD Product. Warranty: The Tilt Rotate accessory is warranted free from defects in workmanship and materials for 90 days. Maintenance: There is no regularly scheduled preventive maintenance recommended by IBM, and IBM Maintenance Agreements are not available. Customer Responsibility: The customer is responsible for mounting the Display Station on this accessory.

Keys (P/N 4420756): The 8775 with the Setup Keylock (#1009) special feature is shipped with two keys. Additional keys may be purchased only from IBM. Vendor will supply additional keys only to original purchaser. The 8775 Security Keylock (#6340) special feature is shipped with two keys. Additional keys may be purchased only from IBM (P/N 4420756). Vendor will supply additional keys only to original purchaser.

Magnetic Hand Scanner (MHS) (P/N 4123494, #9440): The Magnetic Hand Scanner (MHS) attaches by a 1.5m coiled cable to a number of data entry and reporting devices that have an appropriate magnetic adapter feature. It allows the user to read magnetic stripe labels that are attached to shelves, cartons, machines, etc. It can also be used to read magnetic stripe tags which are hand-held or placed on a flat surface. See appropriate unit for prerequisites and possible limitations. The MHS has three lights and an audible buzzer which provide feedback to the user on the status of the scanned data. With proper encoding the MHS can read a stripe in either direction. Field Installation: Yes. Prerequisites: #4999, #3626, #3623, #3905. Ordering Instructions: Contact IBM.

Maintenance: High densities of hard particulates may decrease scanner head life. In this environment, customer should consider protecting the media to reduce the frequency of head assembly replacement. Where there are high densities of corrosive gases, more frequent head assembly replacement may be required. There is no regularly scheduled preventative maintenance recommended by IBM. Primary maintenance for the Magnetic Scanners will be done by the customer following the problem determination and part replacement procedures.

The following are a recommended number of spare scanners which the customer may want to consider stocking -- for 50 scanners, 2 spares -- for 100, 3 -- for 150, 4 -- for 200, 5. Warranty: The Magnetic Scanner Accessories are warranted free from defects in workmanship and materials for 90 days. In countries other than Canada, warranty service for the Magnetic Scanners will be preformed by the CE. In Canada, warranty service for the Magnetic Scanners will be performed at the Repair Center. The customer will fill out a Repair Center Machine Repair Authorization Form #2110, pack and mail it and the defective Scanner to:

IBM Canada Ltd.
Canadian Distribution Center
Dept. 415
75 Barber Green Road
Don Mills, Ontario M3C 1H7

Optionally, the customer can obtain post-warranty maintenance on a time-and-material basis from CE other than Canada. In Canada, optional IBM maintenance is available on a time-and-materials basis at the Repair Center. Authorization Form #2110 applies.

Magnetic Slot Reader (P/N 4123500, #9441); Magnetic Slot Reader, Dual Entry (P/N 4123520, #9442): The Magnetic Slot Reader (MSR) and Dual Entry Magnetic Slot Reader (DEMSR) attach by a 1.5m cable to a number of data entry and reporting devices that have an appropriate magnetic adapter feature. These slot readers accommodate a wide range (height and length) of magnetic striped card stock and plastic badges including: Magnetic striped 80-column cards, operator identification badges, large and small credit cards,

etc. The MSR and DEMSR have three lights and an audible buzzer which provide feedback to the user on the status of scanned data. Holes in the bottom of the MSR allow optional attachment to an appropriate flat surface. The MSR has a wide opening on one end to facilitate reading of badges or documents. The DEMSR has wide openings on both ends to facilitate reading in either direction. Field Installation: Yes. Prerequisites: #4999. Ordering Instructions: Contact IBM. Maintenance: High densities of hard particulates may decrease scanner head life. In this environment, customer should consider protecting the media to reduce the frequency of head assembly replacement. Where there are high densities of corrosive gases, more frequent head assembly replacement may be required. There is no regularly scheduled preventative maintenance recommended by IBM. Primary maintenance for the Magnetic Readers will be done by the customer following the problem determination and part replacement procedures. The following are a recommended number of spare readers which the customer may want to consider stocking -- for 50 readers, 2 spares -- for 100, 3 -- for 150, 4 -- for 200, 5. Warranty: The Magnetic Reader Accessories are warranted free from defects in workmanship and materials for 90 days. In countries other than Canada, warranty service for the Magnetic Scanners will be preformed by the CE. In Canada, warranty service for the Magnetic Scanners will be performed at the Repair Center. The customer will fill out a Repair Center Machine Repair Authorization Form #2110, pack and mail it and the defective Scanner to:

IBM Canada Ltd.
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Dept. 415
75 Barber Green Road
Don Mills, Ontario M3C 1H7

Optionally, the customer can obtain post-warranty maintenance on a time-and-material basis from CE other than Canada. In Canada, optional IBM maintenance is available on a time-and-materials basis at the Repair Center.

Note: The MHS, DEMSR and the MSR read magnetically encoded information from an alphameric character set. The MSR also reads the same 10 character numeric only set as the 3277 operator identification card reader which is not a subset of the alphameric character set. For further description of both character sets, see "IBM 8775 Display Terminal Character Set", GA33-3041. The alphameric character set can only be read if the Enhanced Function (#3626) is installed. Limitation: The 3277-like character set numeric only magnetic cards coded with alternate end of message character (hexadecimal "C") cannot be read by MSR, DEMSR or MHS. The MSR, DEMSR or MHS cannot be used to logon to a SNA network.

A variety of magnetic documents, tags and labels which the MSR, DEMSR and MHS can read, may be obtained from NDD. Some, depending on length, can be encoded by devices such as the 3642 Encoder Printer. For complete information on the availability of pre-encoded striped plastic cards contact an NDD sales representative. The following cable assemblies can be used to extend the Magnetic Slot Reader or Magnetic Hand Scanner distances. Limitation: Extension cables cannot be plugged into other extension cables. Prerequisites: Feature #4999.

Description	Feature	P/N
6m (19.7 ft)	#9106	4832986
12m (39.4 ft)	#9107	4832987

One of the following MSR customer service manuals should be ordered. All other countries should order English translation:

English	GA24-3663
French	GA11-0007
Japanese	NG24-3663
Spanish	GA10-8101

SUPPLIES (NONE WITH INITIAL MACHINE ORDER)

8809 MAGNETIC TAPE UNIT MDLS 1A, 1B, 2, 3

THERE IS MORE THAN 1 TEXT VERSION FOR THIS PRODUCT

HIGHLIGHTS

PURPOSE

Magnetic tape unit for the 4331 or 4361 Processor and 8100 Information System. Provides high-speed save/restore capability for fixed DASD as well as satisfying the DB/DC journaling, tape interchange and processing requirements of the using system.

MODELS 1A, 1B, 2, 3

Model 1A A01: First drive which attaches to the 8101 Storage and I/O unit or the 8140-BXX and CXX Processor or to the 8809 Magnetic Tape Unit Adapter on the 4331 or 4361 Processor.

Model 1B B01: First drive which attaches to the 8130, 8140 or 8150 Processor.

Model 2 002: Second, fourth or sixth drive which attaches to the first (mdl 1A or 1B), third drive (mdl 3) or fifth drive (mdl 3), respectively.

Model 3 003: Third drive or fifth drive which attaches to a mdl 2.

Limitations: The reel inertia is critical to the 8809 motion control system. An example of a reel that does not meet the 8809 inertia requirement is the 26.7cm (10.5 in.) large hub reel (P/N 1669031) that is designed to hold 366m (1200 ft) of tape. A detailed description of tape reel inertias is contained in the "Tape Requirements for One-Half Inch Tape Units", GA32-0006-5, and "The IBM 8809 Magnetic Tape Description", GA26-1659.

Interchange of tape written on an 8809 at its extended environment with a current IBM tape drive at its non-extended environment may result in an inter-layer slippage, permanent or temporary errors. A detailed description of tape environmental requirements is contained in the "Tape Requirements for One-Half Inch Tape Units", GA32-0006-5.

Maximum: 8100 Information System: Up to four 8809 units can be attached to an 8100 Information System mdl 1A or 1B followed by a mdl 2, mdl 3 and another mdl 2.

4331 Processor or 4361 (operating in a VM environment): Up to six 8809 units can be attached to a 4331 Processor mdl 1A followed by a mdl 2, mdl 3, mdl 2, mdl 3, and another mdl 2.

Prerequisites

- 8100 Information System for mdl 1A.
 - Magnetic Tape Attachment (#4521) on the 8101 Storage and I/O Unit.
 - Diskette Drive and Magnetic Tape Attachment (#1507) on the 8101 mdl A10 or A20.
 - Magnetic Tape Attachment #4901 on 8140-BXX and CXX Processor.
- For the 4331 Mdl Group 1, 2, or 11 Processor: The 8809 Magnetic Tape Unit Adapter (#4910).

Magnetic Tape: IBM Multi-System Tape (MST) or equivalents, is recommended for optimum performance. The Minimum properties required for satisfactory performance are described in "Tape Requirements for One-Half Inch Tape Unit", GA32-0006-5. Assuming media requirements are met, the 8809 accommodates most industry standard reel sizes of 15.9cm (6.25 in.), 17.8cm (7.0 in.), 21.6cm (8.5 in.), and 26.7cm (10.5 in.).

The 8809 Magnetic Tape Unit transports tape directly from reel-to-reel without capstans or vacuum columns, with tape tension and velocity controlled electronically.

The 8809 will operate in one of two operating modes selectable by the host processor. The first mode is start/stop mode in which the 8809 runs at .3175 meters per second (12.5 in. per second) to achieve a 20,000 bytes per second instantaneous data rate. The second mode is streaming mode in which the 8809 runs at 2.54m per second (100 in. per second) to achieve a 160,000 bytes per second instantaneous data rate for volume dumps.

Tapes written in either start-stop or streaming mode have an identical tape format. This 63 bytes per millimeter (1600 bytes per inch) phase encoded tape format permits the compatible interchange of tapes with the 2400 and 3400 tape subsystems operating with the same recording format and density.

Note: The 8100 Information System will require dedicated operation to achieve streaming mode for save/restore volume dumps. The 4331 Processor may require dedicated operation and/or selection of the long gap (30.5mm or 1.2 in.) mode in order to achieve acceptable performance in streaming mode.

Checking: Each byte is parity checked while tape is being read. Data written on tape is read back and checked as in reading, with full parity check.

Error Correction: Single track error correction "in flight" takes place similar to other IBM tape products in 63 bps (1600 bpi) Phase Encoded Mode during read operations.

Characteristics

	Start/ Stop	Streaming*
Tape Speed (plus or minus 5%)	.3175m/s (12.5 ips)	2.54m/s (100 ips)
Data Rate, Instantaneous	20kb/s	160kb/s
Access Time (Write)	40 ms	335 ms
Access Time (Read)	44 ms	335 ms
IBG Time, Nominal 0.6 in. gap (1.524cm)	48 ms	6 ms
IBG Time, Nominal 1.2 in. gap (3.048cm)	96 ms	12 ms
Rewind Time (2400 ft. reel) (732m)	2.6 min.	2.6 min.

* Refer to "IBM 8809 Magnetic Tape Description", GA26-1659, for additional details.

Publications

"Tape Requirements for one-half Inch Tape Units", GA32-0006-5, at: 556, 800, 1600 and 6250 bpi.

"IBM 8809 Magnetic Tape Unit Description", GA26-1659.

"Introduction to the IBM 8100 Information System", GA27-2875.

"IBM 8100 Information System Installation Manual - Physical Planning", GA27-2877.

"IBM 8100 Information System Configurator", GA27-2876.

"IBM 4300 Processors Summary and Input/Output and Data Communications Equipment Configurator", GA33-1523.

"Input/Output Equipment Installation Manual -- Physical Planning for S/360, S/370 and 4300 Processors", GC22-7064.

SPECIFY

Unless indicated otherwise, these specify codes are only available at time of manufacture.

- Voltage (AC, 1-phase, 3-wire): (not required on mdl 2)

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
220V #2803	
240V #9914	

| Voltage conversion at same Hz. Field Installation: Yes.

- 8100 System Attachment: #9606 for mdl 1A and 1B only. Also #9933 if the mdl 1B is attached to 8150. Field Installation: Yes.
- Power Cord (Not required on mdl 2): With non-locking plug #9891. (Canada only > With waterproof locking plug #9890. <) (Japan only > With locking plug (100V only) #9890. <) (Japan only > Without locking plug #2710. <) Field Installation: Yes.
- 4331 or 4361 Processor Attachment: #9607 for mdl 1A only. Field Installation: Yes.

- Color 4331 or 4361 Processor and for mdl 1A only:

Willow Green	#9060
Classic Blue	#9063
Garnet Rose	#9061
Charcoal Brown	#9064
Sunrise Yellow	#9062
Pebble Gray	#9065

- Machine Nomenclature:

Canadian French	#2935
English US	#2924
French	#2928
Germany	#2929
Italian	#2932
Portuguese	#2933
Spanish	#2931

SPECIAL FEATURES

8100 System Multi-Drive (#4920): (Mdl 1B) Required on mdl 1B if more than one tape drive (additional Mdl 2 or Mdl 3) is attached to an 8100 System. Field Installation: Yes.

MODEL CONVERSION (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

8809 MAGNETIC TAPE UNIT MDLS 1C, 2C

PURPOSE

Magnetic tape unit for the 5360 System. Provides high-speed save/restore capability for fixed DASD as well as satisfying tape data interchange requirements.

MODELS 1C, 2C

Model 1C C01: First drive which attaches to the 5360 system unit.

Model 2C C02: Second drive which attaches to model 1C.

Limitations: Interchange of tape written on an 8809 at its extended environment with a current IBM tape drive at its non-extended environment may result in an inter-layer slippage, permanent or temporary errors. See "Magnetic Tape" below.

Maximum: Up to two 8809 units can be attached to the 5360 system, a mdl 1C and a mdl 2C.

Prerequisites: 8809 Magnetic Tape Attachment (#7960) on the 5360 system unit.

Customer Setup: The 8809 mdls 1C and 2C are customer setup machines. Detailed setup instructions are included with each machine.

HIGHLIGHTS

The 8809 Magnetic Tape Unit transports tape directly from reel-to-reel without capstans or vacuum columns, with tape tension and velocity controlled electronically. Dual speed capability is achieved by offering two operating modes selectable by the 5360 system. In low speed mode (start/stop), the 8809 runs at 0.3175m

per second (12.5 in. per second) to achieve 20,000 bytes per second instantaneous data rate. In high-speed mode (streaming), the 8809 runs at 2.54m per second (100 in. per second) to achieve 160,000 bytes per second instantaneous data rate.

Tapes written in either start/stop or streaming mode have an identical tape format. This 63 bytes per millimeter (1600 bytes per inch) phase encoded tape format permits the compatible interchange of tapes with the 2400 and 3400 tape subsystems operating with the same recording format and density.

Note: 5360 system programming for the 8809 supports tape data interchange in start/stop mode and save/restore in streaming mode. To achieve streaming, the save/restore task may require the highest priority or be the only active task.

Magnetic Tape: IBM Multi-System Tape (MST), or equivalent, is recommended for optimum performance and reels must conform to 8809 inertial requirements. The reel inertia is critical to the 8809 motion control system. Assuming these requirements are met, the 8809 accommodates most industry standard reel sizes of 15.9cm (6.25 in.), 17.8cm (7.0 in.), 21.6cm (8.5 in.), and 26.7cm (10.5 in.) with normal hub. An example of a reel that does not meet the 8809 inertial requirement is the 26.7cm (10.5 in.) large hub reel (P/N 1669031) that is designed to hold 366m (1200 ft) of tape. A detailed description of tape reel inertias, minimum tape properties for satisfactory performance and tape environment requirements is contained in "Tape Requirements for IBM One-Half Inch Tape Units," GA32-0006-5, or later versions.

Checking: Each byte is parity checked while tape is being read. Data written on tape is read back and checked as in reading, with full parity check.

Error Correction: Single track error correction 'in flight' takes place similar to other IBM tape products in 63 bps (1600 bpi) Phase Encoded Mode during read operations.

Characteristics

	Start/Stop	Streaming*
Tape Speed (+/- 5%)	0.3175mps (12.5ips)	2.54mps (100ips)
Data Rate, Instantaneous	20kbs	160kbs
Access Time (Write)	40ms	335ms
Access Time (Read)	44ms	335ms
IB Gap Time, Nominal		
Gap: 1.524cm (0.6in)	48ms	6ms
Gap: 3.048cm (1.2in)	96ms	12ms
Rewind Time		
732m (2400 ft)	2.6 min	2.6 min

Customer Responsibilities: Each 8809 mdl 1C or 2C is packaged with the necessary installation and operational instructions. A 20-ft signal cable is shipped with each unit. In addition, the mdl 1C includes a check-out tape.

The customer is responsible for the following:

- Adequate site preparation.
- Receipt, unpacking and placement of the 8809.
- Physical setup and attachment of cables from the mdl 1C to the 5360 System Unit and from the mdl 2C to mdl 1C.
- Check out according to instructions with check-out tape supplied.
- Using and following 5360 System Unit problem determination procedures before calling IBM for service.

- Relocation if desired or if required to allow IBM service access.
- Disconnection, packing and movement to customer's shipping dock at the time of discontinuance.

Publications

- "IBM 8809 Magnetic Tape Unit Model 1C and 2C Operator's Guide", GA32-0077.
- "IBM 8809 Magnetic Tape Unit Model 1C and 2C Description", GA32-0078.
- "IBM 8809 Magnetic Tape Unit Model 1C Set-Up Instructions", GA32-0070.
- "IBM 8809 Magnetic Tape Unit Model 2C Set-Up Instructions", GA32-0071.

- "Relocate/Discontinue Instructions for Single Unit Installations of the IBM 8809 Magnetic Tape Unit", GA32-0072.
- "Relocate/Discontinue Instructions for Two-Unit Installations of the IBM 8809 Magnetic Tape Unit", GA32-0073.
- Tape Requirements for IBM One-Half Inch Tape Units at: 556, 800, 1600, and 6250 bpi, GA32-0006-5 or later versions.

SPECIFY

Unless indicated otherwise, these specify codes are only available at time of manufacture.

- Voltage (AC, 1-phase, 3-wire):

50 Hz	60 Hz
100V #2804	100V #2730
110V #2805	110V #2822
200V #2806	120V #9911
220V #2813	127V #2823
230V #2821	200V #2732
240V #2801	208V #9902
220V #2803	
240V #9914	

Voltage conversion at same Hz. Field Installation: Yes.

- Power Cord: (Canada only> With waterproof locking plug #9890.<) With non-locking plug #9891. (Japan only> Without plug #2710. If no power cord is specified a cord with plug based on country code will be provided. Field Installation: Yes.<)
- Color: Pearl White background, specify accent:

Pebble Gray	#9065
Classic Blue	#9063
Willow Green	#9060
Sunrise Yellow	#9062
Garnet Rose	#9061
Charcoal Brown	#9064

Note: 5360 System accent is Pebble Gray only.

- Machine Nomenclature:

Canadian French	#2935	Japanese	#2930
English	#2924	Spanish	#2931

- Documentation Group:

Canadian French	#0077
Japanese English	#0055
Japanese	#0073
Spanish Speaking	#0069
United States	#0056

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES (NONE)

SUPPLIES (NONE)

8815 SCANMASTER I

PURPOSE

- For capturing and transmitting noncoded documents to an 4300, S/370, 303X, or 308X system.
- For capturing and transmitting noncoded documents directly to another Scanmaster I.
- For printing noncoded documents.
- For printing formatted text documents.

The Scanmaster I is an SNA/SDLC device designed for system-attached operation and terminal-to-terminal operation. It attaches to 4300, S/370, 303X, and 308X processors over switched or nonswitched communication facilities at speeds up to 9600 bps. It will communicate directly with another remote Scanmaster I over a public switched telephone network or private switched or non-switched voice facilities at speeds up to 9600 bps.

MODEL

Model 1 001: Can be tailored, i.e., equipped with appropriate features for use in system-attached and terminal-to-terminal operations. Communication features permit operation over switched or nonswitched communication facilities via an external modem at speeds up to 9600 bps. Includes Mark Sense Control for addressing and/or identifying documents, and Character Print for printing data and text documents, and messages at 12.7 cpi and 6.1 lpi in (Except Japan > prestige-style font <) (Japan only > Katakana <) in system-attached operations. The Model 1 will accommodate the Keypad feature for operators to key-in document addressing and/or identification information and password to the host.

Scanmaster I Model 1 Structure

	Mdl 1
CCA W/O CLOCK	STD
EIA/CCITT *	OPT
X.21 LEASED *	OPT
MARK SENSE CTRL	STD
CHARACTER PRINT	STD
KEYPAD	OPT
PEDESTAL	OPT

* Must select one of these options.

Prerequisites: The Scanmaster I mdl 1 requires an external modem interface or an X.21 Adapter for nonswitched networks.

Customer Setup (CSU): The Scanmaster I is designated as a Customer Setup Unit, thereby offering the customer early availability and relocation flexibility. For additional information on CSU, contact IBM.

HIGHLIGHTS

The Scanmaster I is a high-speed, high-quality document transceiver consisting of a controller, a scanner and a printer in one integrally-designed desk-height unit for use by casual operators.

System-attached and terminal-to-terminal operations are available. In addition to the basic transceiver functions, the Scanmaster I offers:

- A convenience copying capability, one copy at a time.
- A compression/decompression function for compressing the scanned data prior to passing it to the communication line and for decompressing the incoming noncoded communication line data prior to printing.
- A Mark Sense Control function for system-attached operations that detects addressing and identifying marks written by the user on a Cover Sheet heading the noncoded input document. The Scanmaster I transmits the digital representation of this mark pattern to the host for interpretation.
- A Keypad feature provides a 16-keypad and 10-digit readout on the operator panel to allow operators to key-in document addressing and/or identification information and password to the host.
- A message-print capability in the system-attached operations for printing host messages, such as time stamping, addressing, and buck slip information on the cover page preceding a noncoded output document.
- A Character Print function for system-attached operations for printing formatted EBCDIC-coded text and data documents.
- External modem interface for attaching external modems with speed up to 9600 bps with switched network backup (SNBU).
- Communication adapters for attaching to the X.21 leased digital networks.

Controller: The controller controls all online and offline operations. The Scanmaster I communicates with another Scanmaster I or with the host system using SNA with Advanced Program-to-Program Communication (APPC) and SDLC. APPC features a new LU type (6.2) providing common session protocols for document interchange among office-oriented systems and program products. SDLC communication protocols provide accurate transmission. SDLC as used in the Scanmaster I conforms to a subset (unbalanced normal mode) of both ISO HDLC and ANSI ADCCP standards.

Scanner: The scanner is a feed-through mechanism with Automatic Document Feed (ADF). The ADF chute accepts multiple documents with dimensions of (Canada only > 128mm (5 in.) to 216mm (8.5 in.) wide x 128mm (5.0 in.) to 356mm (14.0 in.) long.<) (Except Canada > 128mm (5 in.) to 210mm (8.27 in.) wide (*) x 128mm (5.0 in.) to 356mm (14.0 in.) long.<) The sum of the width and length must be a minimum of 310mm (12.2 in.). For example, if the width is 128mm (5.0 in.) the minimum allowable length is 182mm (7.2 in.). Similarly if the length is 128mm (5.0 in.) the minimum allowable width is 182mm (7.2 in.). Approximately 30 pages with a total thickness of 3mm (0.12 in.) may be inserted to minimize operator intervention. (Except Canada > Note: * 216mm (8.5 in.) if #2894 is specified for a 216mm Document Chute.<) The scanning resolution is 8 dots/mm (203 dots/in.) in the horizontal direction. In the vertical direction, the scanning resolution is 7.7 lines/mm (196 lines/in.) or 3.85 lines/mm (98 lines/in.). (The selection of scanning resolution, which can be made manually, or specified by the Cover Sheet for system-attached operations, can be made based on a trade-off between transmission time and the quality requirement for the document being scanned.) Darkness is selected via the Normal Original/Light Original switch on the operator panel or via the Cover Sheet for system-attached operations. Light Original is used when

copies are to be made from an original document that does not have enough contrast for normal scanning.

Printer: The printer is a high-quality, multi-stylus, electrostatic printer that uses a pressure roller as a fixing mechanism. Received documents are printed and automatically cut to the length of the transmitted documents. Printed documents are from (Canada only) > 216mm (8.5 in.) wide x 148mm (5.8 in.) long to 216mm (8.5 in.) wide x 356mm (14.0 in.) long. < (Except Canada > 210mm * (8.27 in.) wide x 148mm (5.8 in.) long to 210mm * (8.27 in.) x 356mm (14.0 in.) <.) A scanned document as short as 128mm (5.0 in.) will be cut to the length of 148mm (5.8 in.) due to the printer feed mechanism. (Except Canada > Note: * 216mm (8.5 in.) if 216mm wide paper roll is used. <.) A 150m (492 ft.) long paper roll can be loaded. The printing resolution is 8 dots/mm (203 dots/in.) in the horizontal direction and 7.7 lines/mm (196 lines/in.) in the vertical direction. Note that the effective print width is 200mm (7.87 in.) for (Canada only) > a 216mm paper roll. < (Except Canada > both a 210mm and 216mm paper roll. <.) Note: When the selected scanning resolution is 3.85 lines/mm (98 lines/in.), the output document is printed at 7.7 lines/mm (196 lines/in.). This is accomplished by printing each line twice. The toner reservoir in the printer can be filled with a bottle of toner (100 g), which can develop approximately 3,000 pages of typical office documents.

Communications: The Scanmaster I mdl 1 communicates with each other on a terminal-to-terminal basis using SNA/SDLC communication protocol over voice communication facilities. The Scanmaster I mdl 1 also communicates with a 4300, S/370, 303X, or 308X system through a 3705 communication controller, using SNA/SDLC communication protocol.

Communication Facilities: The Scanmaster I mdl 1 operates in half-duplex point-to-point or multipoint mode on half-duplex or duplex facilities at transmission speeds of 2000, 2400/1200, 4800/2400, 7200/3600, and 9600 bps on nonswitched facilities. The Scanmaster I mdl 1 also operates in half-duplex point-to-point mode at transmission speeds of 2400/1200 and 4800/2400 bps on switched facilities. See M2700 pages for details of the communication facilities/services.

Performance: The performance of the Scanmaster I subsystem is dependent upon many factors such as:

1. Native speeds of the scanner and printer - 30mm/sec (1.2 in/sec).
2. Overlap operations of scanning and printing (at the Scanmaster I or remote Scanmaster I in terminal-to-terminal operation) and processing time for the last page (cut and eject).
3. Tasks executed.
4. Document content/page length and resolution selected.
5. Text format - number of print lines, number of print characters in a line, skipping, page length, etc.
6. Modem speeds
7. Quality of communication line, which affects transmission time of data.
8. Host system availability and software implementation.

Therefore, an analysis of each document is necessary to find the actual throughput/performance.

The following formulas, with notes, are included for reference to approximate the Scanmaster I performance. Refer to IBM Aids for system performance evaluation information.

Local Copy

$$T = N \times (.9 \times L + 2.5) + 14$$

Where: T - Total time (in seconds)
N - Number of pages to copy
L - Length of original (in.)

Note: Total time is from depression of Local Copy key to ejection of last page.

If the length of the original is less than 10 inches, the total copy time may exceed the approximated time.

Example: Copying a four-page document of letter-size pages (11 inches long)

$$T = 4 \times (.9 \times 11 + 2.5) + 14 = 64 \text{ sec. (approximately)}$$

Text Transmission

$$LPM = 800 \times R / ((4.1 + .03 \times C) \times R + 1)$$

Where: LPM - Lines per minute.
R - Ratio of lines printed per page to the maximum number of lines available per page.
C - Average number of character positions in the printed lines.

$$T = 60 \times L / LPM$$

Where: T - Time to print a page (in seconds).
L - Lines printed on page.
LPM - Lines per minute from above formula.

$$PPM = 60 / ((\text{sum. of } T \text{ above}) / N + 2 + 12 / N)$$

Where: PPM - Pages per minute.
T - Time to print a page from above formula.
N - Number of text pages

Note: Excessive skipping in successive pages will degrade throughput performance.

Example: If 22 of 66 lines on a page are printed, R=0.33. Assuming an average line length of 75 character positions (C=75), then:

$$LPM = 800 \times .33 / ((4.1 + .03 \times 75) \times .33 + 1) = 85 \text{ (approx.)}$$

$$T = 60 \times 22 / 85 = 16 \text{ (sec) (approx.)}$$

If three pages of the same text format are printed,
PPM = 60 / ((16 + 16 + 16) / 3 + 2 + 12 / 3) = 2.7 (approx.)

Document Transmission (terminal-to-terminal operation)

$$T = \text{summ. of page trans. time} (*) + 17$$

Where: T- Total time (in seconds) from start of send operation to completion of receive operation at remote Scanmaster I including page-eject time.

Page transmission time - time per page transmission (the concurrent operation of scan, transmission, print functions are included).

* For comparison of transmission time, three types of pages have been selected as; A, basic diagrams; B, double spaced typed letter, and; C, single spaced typed text. The transmission speeds shown below are under error-free conditions.

MACHINES

PAGE TYPE	RESOLUTIONS SELECTED	TRANSMISSION SPEED (SEC/PAGE) AT LINE SPEEDS OF (BPS)			
		2400 a	4800 a	4800 b	9600 b
A	Normal	34	19	17	14
	Fine Detail	49	29	27	27
B	Normal	46	26	23	16
	Fine Detail	67	40	37	29
C	Normal	94	52	46	26
	Fine Detail	137	76	69	40

a: Switched line facility
b: Leased line facility

Modems: One external IBM modem, or equivalent may be attached to a Scanmaster I mdl 1 that is equipped with the prerequisite External Modem Interface #3701.

IBM Modems	Speed(bps)	Line
3863-1/2	2400/1200	Nonsw or Sw Voice Grade
3864-1/2	4800/2400	Nonsw or Sw Voice Grade
3865-1/2	9600/4800	Nonswitched
5979-L41	9600	Baseband, Nonsw

Switched Network Backup (SNBU) available for modems provides backup for nonswitched telecommunication lines. SNBU allows restoration of operation between two point-to-point modems, or between a multipoint control modem and any multipoint tributary modem.

SNBU feature available for modems may also be used to communicate with another Scanmaster I equipped with the equivalent modem in terminal-to-terminal operations when the Scanmaster I is not being used in system-attached operations. Four-wire Switched Network Backup is available for 3863, 3864, or 3865 modems. For communication capabilities, product utilization, and special features, see M2700, 3863, 3864, and 3865 pages.

Security: The 3845 mdls 1, 2, 11 and 12 and 3846 mdls 2 and 12, where available, can be attached to the Scanmaster I mdl 1 via the External Modem Interface (#3701) to safeguard data transmitted over unprotected communication line through cryptography.

Problem Determination Procedures: Problem determination and recovery routines and procedures have been designed into this unit to provide greater availability to the customer. See "Customer Responsibilities" below.

Network Problem Determination Application (NPDA), a program product, operates with VTAM to assist in performing communication network problem determination/isolation and enhances the availability and serviceability of the Scanmaster I. See NPDA in the Program Products section.

Customer Responsibilities: The customer is responsible for:

- Site and system preparation.
- Arranging for the telecommunication service supplier to install the appropriate communication service equipped with the required connecting device.
- Arrangements with other vendors for equipment/facilities, if necessary.
- Receipt at customer's receiving dock, unpacking, and placement of the Scanmaster I.

- Physical setup, connection of cables to communication lines/modems and IBM devices, incorporating protected customer access areas, switch settings, and checkout.
- Performing the problem determination procedures and completing a problem report form before calling for IBM service.
- Procuring the Scanmaster I consumables - Toner, Paper and Felt wiper. See "Supplies".
- Replacement of felt wiper in the printer under the cover. See "Supplies".
- Designing and procuring the Cover Sheets when using host controlled distribution of documents. See "Supplies".
- Paper and Toner are affected by temperature and humidity. Each machine location must be compared to the acceptable environmental condition to ensure satisfactory print quality. The customer must be aware of these environmental limitations.

Publications: See KWIC Index, G320-1621, or specific system bibliography.

SPECIFY

Except for WT power requirements and nomenclatures, Specify codes are not normally required to order a Scanmaster I. If codes are not specified, the machine is shipped with the following specifications:

- Power Cable Length: 2.8 meters (9 feet).
- Communication Cable Length:
6.1 meters (20 feet) for attachment to standalone modem, or to communication facility when an X.21 Adapter for nonswitched networks is used.
- (Canada only) > Document Width: 216mm Document Chute
216mm Paper-Roll Flange <
- (Except Canada > Document Width:
210mm Document Chute
210mm Paper-Roll Flange <
- Power (AC, 1-phase): Specify #2998 for an A/FE country, and select one of the following:

50/60 Hz	60 Hz
100V #2804	120V #2800*
110V #2805	
200V/208V #2806	
220V #2813	
230V #2821	
240V #2801	
127V #2823	

* Includes requirement for 115V.

Japan only. For machines requiring 200V and higher, a country RPQ should be initiated.

- Power Cable Plug (except Canada and Japan): If the most commonly used power cable plug in the country is not desired, a country RPQ may be initiated. For details concerning power plugs, refer to "IBM Scanmaster I Planning and Site Preparation Guide", GA18-2095.

Note: If a power supply other than the most common is desired, a country RPQ should be initiated.

- Machine Nomenclature: Specify one of the following:

Canadian French	#2935	Japanese	#2930
English UK	#2927	Spanish	#2931
English US	#2924		

The remainder of this Specify section can be ignored unless special circumstances require a deviation from the standard default values.

- Communication Cable Length: If the standard 6.1m (20 ft.) communication cable is not desired, specify #9261 for a 3.0m (10 ft.) cable, #9262 for a 9.1m (30 ft.) cable or #9263 for a 12.2m (40 ft.) cable.

- (Except Canada> Document Width: If Letter (216mm) document width is desired, specify #2894 for:

216mm Document Chute
216mm Paper-Roll Flange<)

SPECIAL FEATURES

NON-COMMUNICATIONS FEATURES

Keypad (#4610): Provides a 16-key keypad and 10-digit readout on the operator panel to allow operators to key-in document addressing and/or identification information and password to the host. Limitations: Cannot be used for terminal-to-terminal operations. Maximum: One. Field Installation: No.

Pedestal (#5501): Adds 150mm (5.91 in.) to the height. Maximum: One. Field Installation: No.

COMMUNICATION FEATURES

- | Scanmaster I mdl 1 is provided with communication features without Business Machine Clock.

The Scanmaster I mdl 1 must be equipped with either a #3701, or a #5655.

- | **External Modem Interface (#3701):** Provides a CCITT interface and cable for attachment of an external IBM modem or PTT-mandatory modem that complies with CCITT Recommendation (1980) V.24, V.28, ISO Standard 2110, and other relevant CCITT Recommendations. See M2700 pages. Other external non-IBM modems may be attached, subject to the Multiple Supplier Systems Bulletin. Limitations: Cannot be ordered with #5655. Maximum: One. Field Installation: Yes.

- | **X.21 Adapter For Nonswitched Networks (#5655):** Provides an interface and cable for attachment to the X.21 nonswitched data circuit-terminating equipment (DCE) at speeds of 2400, 4800, and 9600 bps. Limitations: Cannot be ordered with #3701. Maximum: One. Field Installation: Yes.

MODEL CONVERSIONS (NONE)

ACCESSORIES

The following items are available on a purchase-only basis.

Document Chute/Paper-Roll Flange: The machine is shipped with (Canada only> one 216mm (8.5 in.) Document Chute and one pair of Paper-Roll Flanges.<) (Except Canada> one 210mm Document Chute and Paper-Roll Flange or one 216mm Document Chute and Paper-Roll Flange if #2894 is specified with the machine.<) For additional Document Chutes and/or Paper-Roll Flanges, contact IBM. (Except Canada> Limitations: Document Chute and Paper-Roll Flange used in the machine must be the same size.<) Field Installation: Yes. CSU: Yes. Prerequisites: Document Chute Label, see below.

Items	Part Number	Number Shipped
Document Chute		
- 216mm	6829010	one
Paper-Roll Flange		
- 216mm	6828968	one piece*
(Except Canada>		
Document Chute		
- 210mm	6828941	one
Paper-Roll Flange		
- 210mm	6829074	one piece*<)

Note: * Two flanges are required to support a roll of paper.

Document Chute Label: Order P/N 6828258

SUPPLIES

Toner: Toner, P/N 7038486 or equivalent, is required. Note: Each P/N contains six bottles of toner in a carton. Contact IBM for ordering information.

Paper Roll: The following Paper Roll, or equivalent, is required. Note: Each P/N contains six rolls of paper 150m (492 feet.) long in a carton. Contact IBM for ordering information.

Items	P/N
(Canada only>	
Paper Roll - 216mm (8.5 in)	
(Wide-Range Paper)	7038482
Paper Roll - 216mm (8.5 in)	
(Full-Range Paper)	6109607
<)	
(Except Canada>	
Items	P/N
Paper Roll - 210mm (8.25 in)	
(Wide-Range Paper)	7038483
Paper Roll - 210mm (8.25 in)	
(Full-Range Paper)	6109606
Paper Roll - 216mm (8.5 in)*	
(Wide-Range Paper)	7038482
Paper Roll - 216mm (8.5 in)*	
(Full-Range Paper)	6109607

* **Prerequisites for Paper Roll - 216mm:** 216mm Paper-Roll Flange. Shipped with the machine, if #2894 is specified, or can be obtained as an accessory (P/N 6828968).<)

Note: For operating environmental conditions and paper selection, contact IBM.

Felt Wiper: It is necessary to replace the felt wiper after each usage of six paper rolls. To order felt wipers, contact IBM. Note: Each P/N contains 20 felt wipers in a carton.

Note: While other combinations of commercially available papers and toners may work, machine reliability and image quality will vary widely as a function of the paper and toner used. It is recommended that IBM's systems matched supplies referenced above be used for optimum performance.

Cover Sheet: Cover Sheets may be required for system-attached operations. For IBM system-defined (for use with DISOSS, and the Image Distribution System PRPQ 5799-BJA and 5799-BJB) or customization Cover Sheets, contact IBM. A "customization" cover sheet is printed with all mark positions and timing marks so that the customer may overprint operator instructions/nomenclature for any customer applications.

9309 RACK ENCLOSURE

PURPOSE

The 9309 Rack Enclosure provides mounting space and power distribution for 9332 and 9335 DASD. The 9309 enclosure is available in two models, the model 1 and the model 2. The model 1 is 1.0m (39.3 in.) high and the model 2 is 1.6m (62.1 in.). Both models conform to the 19-inch mounting dimension and universal spacing hole pattern in the Electronic Industries Association (EIA) RS-310-C standard for racks, panels, and associated equipment.

MODELS

Model 1 001: 1.0m (39.3 in.), 19 Electronic Industries Association (EIA) standard units

Model 2 002: 1.6m (62.1 in.), 32 EIA standard units

Limitations: The 9309 is intended to operate in the IBM Class C environment with a temperature range of 10 to 40.6 degrees centigrade (50 to 105.1 degrees Fahrenheit).

The service clearance requirement for the enclosure is 5.5 square meters (59.2 square feet).

The model 1 weighs 107kg (235 lbs.) and the model 2 weighs 138kg (303 lbs.).

Both models 1 and 2 can appear in the same configuration.

Maximum: None

Prerequisites: None

HIGHLIGHTS

- Minimal floor space requirement
- AC power distribution and sequencing of 6 outlets
- Emergency power off control
- Class C environment

DESCRIPTION

The 9309 is rack enclosure with industry standard dimensions that make it suitable as a mounting enclosure and power distributor for the 9332 and 9335 DASD products.

The 9309 is available in two models. The model 1 is 1.0m (39.3 in.) high and contains 19 EIA units of vertical mounting space. The model 2 is 1.6m (62.1 in.) high and contains 32 EIA units of vertical mounting space. Both models conform to the Electronic Industries Association RS-310-C standard for racks, panels, and associated equipment. The enclosure accepts 19 inch panels and mounting rails with the universal spacing EIA hole pattern.

The 9309 Rack Enclosure has solid side, top, and bottom panels. The front is open for the installation of electronic equipment, and the rear is covered by a door which may be removed if installation access requires it. All cables enter and exit the 9309 enclosure in the rear.

The 9309 rack enclosure is designed to occupy minimal floor space. Dimensions are 650mm wide (25.6 in.) by 921mm deep (36.3 in.), for a total floor space requirement of 0.6 square meters (6.4 square feet).

Mounted within the 9309 enclosure is a power control compartment. It provides six AC power outlets that are sequenced on from the

bottom to the top. This sequencing is done to minimize AC power surges in the building power distribution when the power switch on the enclosure or on the first enclosure in a string of enclosures is turned on. The outlets provide 220 volt single phase power.

Mounting rails and power cords for the devices that are mounted in the 9309 enclosure are shipped with the device, not the rack enclosure.

Manual power control for the electronic units mounted in the 9309 rack enclosure is available via an OFF/ENABLE switch and an ON button. Multiple 9309 enclosures can be connected together to provide a single point of power control on the primary enclosure. Each 9309 rack enclosure is provided with an emergency power off control.

The 9309 is mounted on casters to make it easy to move. Once in place the casters can be secured for increased stability.

The 9309 is intended to operate in the IBM Class C environment with a temperature range of 10 to 40.6 degrees centigrade (50 to 105.1 degrees Fahrenheit).

Customer Responsibilities: The 9309 Rack Enclosure will be installed by IBM. However, the customer will continue to be responsible for systems installation planning activity. These activities will include but are not limited to:

1. Determining system configuration requirements.
2. Positioning the rack and associated products in the location for installation by IBM.
3. Ensuring the correct power and space is available prior to installation.

Publications: The following publications are shipped with the product:

- "IBM 9309 Rack Enclosure Setup and Operation Guide",
Canadian-French, GA09-0390
US English, GA24-4039
Chinese (Taiwan), T:GA24-4039
Japanese (Kanji), N:GA24-4039
Korean (Hangul), K:GA24-4039
US English, GA24-4039
LA Spanish, GA10-8828
US English, GA24-4039
- "IBM 9309 Rack Enclosure Service Guide",
US English, SY24-4075
LA Spanish, SY10-0018
- "IBM 9309 Rack Enclosure Guide to Analyzing Problems",
Chinese (Taiwan), T:SA24-4077
Japanese (Kanji), N:SA24-4077
US English, SA24-4077
LA Spanish, SA10-8835

- "IBM 9309 Rack Enclosure: Attaching the Stabilizer",
- "IBM 9309 Rack Enclosure Parts Catalog", S124-0155

Additional copies are available for a fee.

The following are also available

- "IBM 9309 Rack Enclosure General Information and Site Preparation Guide",
- "IBM 9309 Rack Enclosure Physical Planning Template (English Units)",
Japanese (Kanji), N:GX24-4046
US English, GX24-4046

- "IBM 9309 Rack Enclosure Physical Planning Template (Metric Units)",

Canadian-French, GX09-0136
US English, GX24-4047
Japanese (Kanji), N:GX24-4047
LA Spanish, GX10-8383

SPECIFY

Unless indicated otherwise, these specify features are available only at time of manufacture.

- AC Voltage: Default input power is 200-240 V, 50/60 Hz, 1-phase, 25 amps. Rack limit is 5 KVA. No specify required.

The default power plug is determined by the country code.

- (Canada only) > Power cords: The default length is 4.3m (14 ft).

#9986 - Length is 1.8m (6 ft). Required in Chicago, Illinois.

#9080 - Watertight power cord.

#9081 - Non-watertight power cord. <) This is the default.

- Color: Pearl white only. No specify required.
- Machine Nomenclature: Specification of nomenclature is optional. The default language is determined from the country code. To override the default, specify one of the codes below:

#2924 - US English
#2928 - French
#2929 - German
#2930 - Japanese (Kanji)
#2931 - Spanish
#2932 - Italian
#2935 - Canadian French
#2969 - Korean (Hangul)
#2980 - UK English
#2982 - Finnish
#2983 - Norwegian
#2987 - Swedish
#2988 - Dutch
#2989 - Belgian-Dutch/French bilingual
#2993 - Danish

- Primary or subsequent rack enclosure. One of the following two codes must be specified:

#9201: This rack is the primary enclosure in the configuration. The primary enclosure is shipped with the following:

Emergency power off control
Power sequence terminator (used on last enclosure in a multiple enclosure configuration)
Power on/off switch

#9202: Subsequent enclosure in the configuration. Subsequent enclosures in the configuration are shipped with the following:

Emergency power off control
Power sequence cable (required to provide a single point of power control in a multiple enclosure configuration)

Configuration. One of the following codes must be specified:

System/38 attachment (see M5381 pages):

#9121: 400.6 MB DASD subsystem
#9122: 801.2 MB DASD subsystem
#9123: 1201.8 MB DASD subsystem
#9124: 1602.4 MB DASD subsystem
#9131: 855.8 MB DASD subsystem
#9132: 1711.6 MB DASD subsystem
#9133: 2567.4 MB DASD subsystem
#9134: 3423.2 MB DASD subsystem
#9135: 2567.4 MB DASD subsystem
#9136: 3423.2 MB DASD subsystem

Unit location on 9309 enclosure is determined by IBM. For special system configurations, submit an RPQ.

On all initial orders, manufacturing will install blank filler panels in unused rack space and bypass plugs in unused outlets. The customer does not need to order these features.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NONE)

ACCESSORIES

1-EIA Unit Blank Filler Panel: Covers unused space in the rack enclosure. Since manufacturing will supply panels for unused space on initial orders, the customer does not need to order them as accessories. Order P/N 62X3443.

3-EIA Unit Blank Filler Panel: Covers unused space in the rack enclosure. Since manufacturing will supply panels for unused space on initial orders, the customer does not need to order them as accessories. Order P/N 62X3444.

5-EIA Unit Blank Filler Panel: Covers unused space in the rack enclosure. Since manufacturing will supply panels for unused space on initial orders, the customer does not need to order them as accessories. Order P/N 62X3445.

SUPPLIES (NONE)

9332 DIRECT ACCESS STORAGE DEVICE

PURPOSE

High-speed, direct-access storage for attachment to a 9370 Information System, to a S/36 (5362 models C02, C03 and C04) or to a S/38 (available only on S/38 models 100, 200, 300, 400, 600 and 700) or to an IBM RT Personal Computer. Models of the 9332 are available for mounting in a 9309 Rack Enclosure or in a "stand-alone" configuration. See sales manual pages of the attaching system for supported configurations.

MODELS

Model 2XX: A disk storage device with one head and disk assembly (HDA) and one actuator and a storage capacity of 200Mb. See "Default Order Entry" for order entry model designations.

Model 4XX: A disk storage device with one head and disk assembly (HDA) and two actuators and a storage capacity of 400Mb. See "Default Order Entry" for order entry model designations.

Limitation: The 9370 processors reserve some of the capacity of the 9332 DASD for system use. Therefore, when attached to 9370 processors, the usable capacity of the 9332-400 DASD is 368Mb (physical capacity is 400.6Mb).

Chaining: By utilizing the "daisy chain" capability of the 9332 attachment architecture, multiple devices may be attached to 9370 processors on a system host adapter. A terminator must be plugged on the last unit on a signal cable path.

Terminator Availability:

- For IBM IPI-3 Models: The terminator is provided with the system DASD Adapter.
- For Small Computer System Interface Models: The terminator is provided with the system connector cable. See specify code #9822 below.

Maximum: See sales manual pages of the attaching system for the maximum number of devices and the configurations supported by the system.

Prerequisites: System configuration assistance is provided by the HONE CF9370 configurator or by the attaching system HONE planning aid.

- An available connecting position on a DASD Adapter on the attaching system unit is required. See M9370, 5362, 5381/5382, 6150/6151 pages.
- For rack-mounted machines, configuration space in a 9309 Rack Enclosure is required. The 9332 occupies 3 EIA units of space in the rack. See M9309 pages.
- For "stand-alone" machines the customer must provide an appropriate, off the floor, horizontal mounting space.

Field Installation: Field Installation of the 9332 is available.

Customer Setup (CSU): The 9332 Stand-Alone Models 220, 250, 420 and 450 are CSU. (The weight of the 9332 is (up to) 36.3 Kg (80 lbs.) and it should be set up by multiple persons). The 9332 Rack-Mounted Models 200, 240, 400 and 440 will be installed by IBM.

Orders for configurations which include the rack and DASD devices will be assembled at the plant and shipped complete.

Two steps in the installation of the 9332 on the S/38 must be done by IBM service personnel:

1. Attaching the signal cable under the covers of the S/38.
2. Initialization and changing the machine configuration record (MCR).

These tasks, whether part of initial 9332 installation or upgrade to an existing system, will be performed by IBM service personnel as part of the installation services for devices shipped from IBM or an IBM Value Added Remarketer.

The customer will continue to be responsible for systems installation planning activity. These activities will include but are not limited to:

1. Determining system configuration requirements.
2. Positioning the rack and associated products in the location for installation by IBM.
3. Ensuring the correct power and space is available prior to installation.

HIGHLIGHTS

Medium capacity DASD:

- 200 or 400Mb (formatted)
- Available in two convenient packaging options -- Rack Enclosure mounting or stand-alone
- ANSI standard system interface (IBM IPI-3)
- Small Computer System Interface (ANS X3.131.1986)
- High performance
- High reliability
- High degree of data integrity
- Self diagnosis maintenance function

DESCRIPTION

The 9332 is a high-speed DASD which is available in two basic models. The model 2XX has a storage capacity (formatted) of 200Mb and one actuator while the model 4XX has a capacity of 400Mb and two actuators. Model conversion is not available. Both capacity machines are offered in convenient 9309 Rack Enclosure mounting or in a stand-alone package for placement on a table or counter. These machines are equipped with a high level system interface (IBM IPI-3 or Small Computer System Interface) which provides a high degree of host independence. The 9332 provides a high level of performance, reliability and data integrity. Multiple units may be attached in one string on a system host adapter. Those models equipped with the Small Computer System interface will attach a RT Personal Computer equipped with #7000. A self-diagnosis maintenance function is incorporated in the 9332. The maintenance function may be invoked locally or from the host system. Integrated power-on testing and back-up diagnostics provide individual FRU (Field Replaceable Unit) or FRU Group isolation.

Publications: The following publications are available for models 200, 220, 400 and 420:

- IBM 9332 Installing Manual (SA21-9804)
- IBM 9332 Analyzing Problems Manual (SA21-9837)
- IBM 9332 Reference Code Guide (SA21-9836)
- IBM 9332 Service Guide (SY31-9026)

(The above 4 manuals are shipped with the product)
 ● "IBM 9332 Planning Manual" GA21-9887 (available from Mechanicsburg.)

For models 240, 250, 440 and 450:

- IBM 9332 Small Computer System Interface Setting Up Manual (SA21-9533)

MACHINES

- IBM 9332 Small Computer System Interface Analyzing Problems Manual (SA21-9534)
- IBM 9332 Small Computer System Interface Reference Code Guide (SA21-9535)
- IBM 9332 Small Computer System Interface Service Guide (SY31-0685)
- (The above 4 manuals are shipped with the products)
- IBM 9332 Small Computer System Interface Planning Manual (GA21-9532) (available from Mechanicsburg)

Planning Information: The 9332 is a Direct Access Storage Device. Models are available providing for installation in a 9309 Rack Enclosure or for convenient stand-alone mounting. Technical information is given in the table below.

Technical Information: The 9332 models 200, 220, 400 and 420 have a high level system interface which is IBM's implementation of the draft ANSI standard for Intelligent Peripheral Interface - level 3 (IBM IPI-3).

The 9332 models 240, 250, 440 and 450 have a Small Computer System Interface which is IBM's implementation of version 1 of ANSI X3.131.1986.

Specified Operating Environment:

- Rack mounted model 400 will be in a 9309 Rack Enclosure and will operate on a 9370 Information System or a S/38.
- Rack mounted models 240 and 440 will be in a 9309 Rack Enclosure and will operate on an RT Personal Computer.
- Stand-alone models 220 or 420 will operate on a S/38; model 220 will operate on a S/36; models 250 and 450 will operate on an IBM RT Personal Computer.

(See sales manual pages of the attaching system for supported configurations.)

Other Technical data

	Model 2XX	Model 4XX
Capacity in Megabytes	200.3	400.6
Format		
Number of Cylinders	1349	1349
User	1346	1346
Reserved	3	3
Access in Milliseconds		
Average	19.5	19.5
Track-to-Track	3.2	3.2
Data Rate--Mb/sec		
Maximum burst (buffer-host) IBM IPI-3	5.7	5.7
Maximum burst (buffer-host) Small Computer System Interface	4.0	4.0
Effective multisector (buffer-host)	1.4-1.9	1.4-1.9
Rotation Speed RPM	3119	3119
Latency in Milliseconds	9.6	9.6
Number of Actuators	1	2
Physical size:		
Rack Enclosure Mounted Models		

Width: 483mm (19 in.)
Height: 133mm (5.25 in.)
Depth: 561mm (22 in.)
(Conforms to 9309 architecture)
Weight: 27.3kg (60 lbs.) (Mdl 200)
29.5kg (65 lbs.) (Mdl 400)

Stand-Alone Models

Width: 486mm (19.1 in.)
Height: 159mm (6.25 in.)
Depth: 630mm (24.8 in.)
Weight: 34.1kg (75 lbs.) (Mdl 200)
36.3kg (80 lbs.) (Mdl 400)

The 9332 occupies 3 EIA units of space in a 9309 Rack Enclosure. Refer to 9309 Rack Enclosure.

The KVA rating of the 9332 is: 0.42 if operating at 110V AC; 0.62 if operating at 220V AC.

Note: Rack Models always operate at 220V AC or 110V AC depending on the voltage of the 9309 Rack Enclosure.

Acoustical level is normal office environment.

Maximum Signal Cable Distances:

1. IBM IPI-3: The maximum distance from the system host adapter to the terminator on the last device in an IBM IPI-3 signal cable path is 75m (246 ft) including internal cabling of all devices on the path.
2. Small Computer System Interface: The maximum distance from the system host adapter to the terminator on the last device in a Small Computer System Interface is 25m (82 ft) including internal cabling of all device on the path.

For additional IBM IPI-3 signal cable planning details see "IBM 9332 Planning Manual" (GA21-9887). For additional Small Computer System Interface signal cable planning details see "IBM 9332 Small Computer System Interface Planning Manual" (GA21-9532).

Customer Responsibilities: The customer is responsible for:

- Determining system configuration requirements.
- Ensuring adequate space in a 9309 Rack Enclosure for a rack-mounted unit or providing an appropriate, off the floor, horizontal mounting space for stand-alone units.
- When signal cables pass through building partitions or between floors of a building the customer is responsible for installation and maintenance of the cables and associated parts for interconnecting the 9332(s) and/or the attached system control unit.

HDA Data Recovery (Plant only): Should data in the field prove unrecoverable, data recovery assistance at an IBM plant will be provided. The customer is required to provide a sufficient number of the appropriate media to contain recovered data when returning the head and disk assembly to the plant for data recovery.

Default Order Entry: See "Specify" for instructions on ordering the required signal cables.

Order by model number as shown in the following table depending on storage capacity and system configuration desired. The appropriate power cord to plug into the power strip in a 9309 Rack Enclosure will be supplied with a rack-mounted unit and a standard power cord will be supplied with a stand-alone unit. Appropriate signal cables must be ordered. Follow instructions in the system configurator or system HONE planning aid or the "IBM 9332 Planning Manual" (IBM IPI-3 - GA21-9887) or the "IBM 9332 Small Computer System Interface Planning Manual" (GA21-9532) and see "Specify" below.

Order Model	Install Model	Capacity	Packaging	System Interface
-------------	---------------	----------	-----------	------------------



IBM Canada Ltd.

M 9332.3
SEP 87

MACHINES

200	200	200Mb	Rack-Mounted	IBM IPI-3
220	220	200Mb	Stand-Alone	IBM IPI-3
240	240	200Mb	Rack-Mounted	Small Computer System Interface
250	250	200Mb	Stand-Alone	Small Computer System Interface
400	400	400Mb	Rack-Mounted	IBM IPI-3
420	420	400Mb	Stand-Alone	IBM IPI-3
440	440	400Mb	Rack-Mounted	Small Computer System Interface
450	450	400Mb	Stand-Alone	Small Computer System Interface

Machine language terminology will be supplied depending on the country origin of the order as shown in the following table:

Country Ordering	Language
Argentina	Spanish
Australia	English
Canada	English
Colombia	Spanish
Hong Kong	English
Korea	English
Japan	Japanese (Kanji)
Mexico	Spanish
Taiwan	English
Venezuela	Spanish

If your country is not listed or if you desire a different machine language than is shown for your country see "Specify".

SPECIFY

All orders and alterations for 9332 DASD associated with a 9370 Information System MUST be configured and validated using the CF9370 configurator on HONE. Orders not validated by this configurator may be rejected at the time of manufacture. The configurator will generate all of the necessary specify codes.

The following specify items are required when ordering a 9332:

- The desired signal cable must be specified
- Models 200, 240, 400 and 440 Specify codes are required to indicate if the machine is to be 1) field installed in an existing

rack or, 2) is to be integrated into the rack at the plant. (See "Field/Plant Install" below.)

Specify codes may be used to request a machine language other than the default language.

Default Order Entry: With the exception of signal cables, specify codes are not required when ordering a 9332. Appropriate signal cables, if not included by the configurator, MUST be specified. (An optional specify code, #9902, may be used to indicate that the machine is not to be installed in a Rack Enclosure for which there is an accompanying order.)

• Signal Cables:

- The required signal cable must be specified depending on the customers system configuration. The appropriate cables must be specified on the 9332 order and will be shipped with machines ordered for initial system installation with the system or for field installation (system add-on).
- Do not specify a cable longer than is required. Space restrictions in a 9309 Rack Enclosure will inhibit installation of the machine with excess cable. Similarly, excess cable "storage" will be a problem with stand-alone units.
- For 9370 Information Systems attachment, use the CF9370 configurator to generate a valid order with the appropriate specify codes.
- For all other orders, use one of the following codes - as outlined by the HONE planning aid, or the "IBM 9332 Planning Manual" (GA21-9887) - when ordering a 9332:

Feature Code	Primary Signal Cable Length (Processor to 9332)	Interconnecting Signal Cable Length (9332 to 9332)
#9801	0.6m (2 ft)	0.6m (2 ft)
#9802	1.5m (4.9 ft)	1.5m (4.9 ft)
#9803	2.5m (8.2 ft)	2.5m (8.2 ft)
#9804	4.0m (13.1 ft)	4.0m (13.1 ft)
#9805	6.0m (19.7 ft)	6.0m (19.7 ft)
#9806	10.0m (32.8 ft)	N/A
#9807	20.0m (65.6 ft)	N/A
#9808	30.0m (98.4 ft)	N/A
#9809	40.0m (131.2 ft)	N/A
#9810	60.0m (196.8 ft)	N/A

- Other Signal Cables: One of the above length signal cables will be supplied as specified. For additional or replacement signal cables see "Accessories".

Select from the following specify codes for Small Computer System Interface models (available only on models 240, 250, 440 and 450):

Use the following specify code ONLY if this 9332 is the FIRST device on a signal cable path (host adapter to FIRST 9332):

Feature Code	Primary Signal Cable Length (Processor to 9332)
--------------	---

#9822	8.0m (26.25 ft)
-------	-----------------

Note: The terminator is shipped with this cable assembly.

Select the following cable for ALL subsequent 9332s on a signal cable path (9332 to 9332):

Feature Code	Interconnecting Signal Cable Length (9332 to 9332)
#9827	1.0m (3.3 ft)

Note: One of the above specify codes (#9822 or #9827) must be used on all orders for the 9332 models 240, 250, 440 and 450.

For additional or replacement Small Computer System Interface signal cables see "Accessories" in the M6150 pages.

Field or Plant Install: (Rack mounted models 200, 240, 400 and 440 only.)

The default for these models is that they will be mounted in the 9309 Rack Enclosure at the IBM plant if they are accompanied by an order for a 9309.

Specify #9902 to indicate that the machine is for field integration in a customer's existing rack.

Also specify one of the following codes when ordering in a rack mounted model 200, 240, 400 and 440 :

- #9990 when the 9332 will be attached to a S/38 or to an IBM RT Personal Computer.
- #9991 when the 9332 will be attached to a 9370 Information System.
- Default parameters are shown below for "Specifies".
- Voltage: The 9332 will be shipped with an automatic switching power supply which will operate on either low voltage (100-127V) or high voltage (200-240V), 50/60 Hz power. No specify code is required.
- Power Cord: The power cord supplied will be as follows:
 - For rack mounted units a standard 1.0m (3.3 ft) cord will be supplied. The cord is pluggable at the 9332 and also provides for convenient power plug into the power strip provided in the 9309 Rack Enclosure. No specify code is required.
 - For stand-alone units, 3.0m (9.8 ft) power cord with the most commonly used plug will be supplied in the following countries:

Argentina	200-240V
Australia	200-240V
Canada	100-127V
Colombia	100-127V
Japan	100-127V
Mexico	100-127V
Venezuela	100-127V

No Specify Code is required. If the default line cord (voltage) is not desired or if a default is not shown for your country, specify desired voltage (and line cord) from the following list:

#0802 - 100-127V
#0801 - 200-240V

- Color: The color of the covers will be pearl white. No specify code is required.
- Language Groups: Machine language terminology defaults will be determined by country origin of the order. See "Default Order Entry". Use one of the following specify codes to obtain a non-standard machine language and/or translated manuals as shown in the following table:

Desired Language	Specify Code	Machine Nomenclature	Translated Manuals
Canadian French	#2935	Canadian French	Yes
Chinese	#2962	English	Yes
Japanese (Kanji)	#2930	Kanji	Yes
Hangeul (Korean)	#2969	English	Yes (1)
Spanish	#2931	Spanish	Yes
US English	#2924	English	English

Note: (1) Only the "Planning Manual", (GA21-9887 or GA21-9532), is translated.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NOT AVAILABLE)

ACCESSORIES

A signal cable is supplied with the 9332. Additional or replacement IBM IPI-3 signal cables are available for purchase (for additional or replacement SCSI signal cables see M6150/6151 pages):

	Length	P/N
Signal Cable	0.6m (2 ft)	6495253
Signal Cable	1.5m (4.9 ft)	6495254
Signal Cable	2.5m (8.2 ft)	6495250
Signal Cable	4.0m (13.1 ft)	6495252
Signal Cable	6.0m (19.7 ft)	6495251
Signal Cable	10.0m (32.8 ft)	6495255
Signal Cable	20.0m (65.6 ft)	6495256
Signal Cable	30.0m (98.4 ft)	6495257
Signal Cable	40.0m (131.2 ft)	6495258
Signal Cable	60.0m (196.8 ft)	6495264

Order desired cable via MSORDER (Category = Accessories/Supplies) on AAS to the Rochester plant. Specify part number desired.

Field Packaging Materials: The following parts are available for purchase by the customer as required.

Description	B/M
9332 Shipping Container (Required for all 9332)	72X5882
9332 Cover Shipping Container (Required for Stand-alone Units)	72X5915

Order desired material via MSORDER (Category = Accessories/Supplies) on AAS to the Rochester plant. Specify part number desired.

SUPPLIES (NONE)

9335 DIRECT ACCESS STORAGE SUBSYSTEM

PURPOSE

High-speed, intermediate-capacity, direct access storage for attachment to 9370 Information System processors (9373 model 20, 9375 models 40 and 60, and 9377 model 90) and System/38 (models 100, 200, 300, 400, 600, and 700). The 9335 is offered for mounting in a 9309 Rack Enclosure which is a 19-inch EIA standard.

See sales manual pages of the attaching system for supported configurations.

MODELS

Model A01: A Device Function Controller which can attach up to four Model B01 devices. The controller is equipped with a new high-level system interface (IBM IPI-3).

Model B01: A Direct Access Storage Device with one Head and Disk Assembly (HDA), two actuators and a storage capacity of 855.8Mb.

Chaining: On the System/38, multiple 9335 Subsystems can be attached on a system DASD adapter string by utilizing the 'daisy chain' capability.

Limitations: The 9370 processors reserve some of the capacity of the 9335 DASD for system use. Therefore, when attached to 9370 processors, the usable capacity of the 9335-B01 DASD is 824Mb (physical capacity is 855.8Mb).

Prerequisites: Subsystem configuration and assistance is provided by HONE under CFS38 for System/38 and CF9370 for 9370 Information Systems.

- An available connecting position on a DASD adapter on the System Unit is required. See M9370 and M5381 pages.

Field installation: The 9335 Direct Access Storage Subsystem will be installed by IBM.

HIGHLIGHTS

The 9335 features high data rate, fast access time, and low cost per byte of storage. Each 9335 model B01 contains one sealed Head Disk Assembly (HDA) with a storage capacity of 855.8Mb (formatted) for System/38 and 824Mb (formatted) for the 9370 Information System. The HDA is a Field Replaceable Unit (FRU). There are two independently addressable actuators. Seeking and rotational positional sensing of an actuator may be overlapped with seeking, rotational position sensing and data transfer of the other actuator. Fixed Block Architecture allows the specification of DASD space in groups of blocks making space independent of tracks or cylinders.

The Model A01 Device Function Controller provides control function for up to four attached Model B01 Direct Access Storage Devices and incorporates self diagnostic maintenance for the Controller and the attached Storage Devices. The controller is equipped with a new high level system interface (IBM IPI-3).

Standard Features:

General: The 9335 has a new high-level system interface which is IBM's implementation of the draft ANSI standard for Intelligent Peripheral Interface - Level 3 (IBM IPI-3).

- Head and Disk Assembly (HDA) per device: 1
- Actuators per HDA: 2
- Capacity in Megabytes: (See "Limitations")
 - Per Device: 855.8Mb
 - Per Actuator: 427.9Mb
- Access in Milliseconds:

- Average: 18ms
- Track-to-Track: 4.5ms
- Data Rate in Mb/sec:
 - Instantaneous: 3Mb/sec
- Average Latency: 8.28ms
- KVA Rating at 240V:
 - Running (Model A01): 0.24 KVA
 - Running (Model B01): 0.72 KVA

Physical Specifications (Mounting Dimensions):

Model A01:

Width - 483mm (19 in.)
Depth - 686mm (27 in.)
Height - 133mm (5.25 in.) 3 EIA units
Weight - 17Kg (38 lbs)

Model B01:

Width - 483mm (19 in.)
Depth - 686mm (27 in.)
Height - 267mm (10.5 in.) 6 EIA units
Weight - 60Kg (132 lbs)

Enhanced Controller function: These devices offer a new high level system interface (IBM IPI-3) which offers significant host independence.

Built-in error handling is provided giving correction for single data error bursts of up to nine bits span as well as detecting all single error bursts of up to 40 bits span.

Hi-Level Integrated Maintenance Function: Integrated analysis procedures provide a high level of Field Replaceable Unit (FRU) isolation at the time of failure. In addition, the 9335 has self-contained diagnostic and power on tests. Intermittent faults are dynamically isolated and predictive error analysis ensures high levels of customer availability.

Signal Cables:

- Signal cables for attachment to 9370 Information System are configured for using the CF9370 configurator on HONE. (See "Order Entry".)
- Signal cables for interconnecting the 9335 to the attaching System/38 and to other 9335s are supplied when a 9335 pre-defined subsystem configuration is ordered. (See M5381 pages).
- Signal cable lengths must be specified when ordering a 9335 as a field add on device. (See "Specify" below.)

Customer Responsibilities: Orders for configurations which include the rack and DASD devices will be assembled at the plant and shipped complete.

The 9335 Direct Access Storage Subsystem will be installed by IBM. However, the customer will continue to be responsible for systems installation planning activity. These activities will include but are not limited to:

1. Determining system configuration requirements.
2. Positioning the rack and associated products in the location for installation by IBM.
3. Ensuring the correct power and space is available prior to installation.

Publications:

- SA33-3143 IBM 9335 Direct-Access Storage Subsystem: Functional Characteristics
- GA33-3144 Setting Up Your IBM 9335

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- GA33-3145 Using Your IBM 9335

Order Entry: All orders and alterations for 9335 DASD associated with a 9370 Information System MUST be configured and validated using the CF9370 configurator on HONE. Orders not validated by this configurator may be rejected at time of manufacture. The configurator will generate all the necessary specify codes.

Predefined 9335 Subsystem configurations for the System/38 are described in the M5381 pages.

If ordering by model number, see "Specify" for instructions on ordering the required lengths of signal cables.

Machine language nomenclature will be supplied depending on the country origin of the order as shown in the following table:

Country	Language
Argentina	Spanish
Australia	English
Bolivia	Spanish
Canada	English
Chile	Spanish
Colombia	Spanish
Costa Rica	Spanish
Dominican Rep	Spanish
El Salvador	Spanish
Ecuador	Spanish
Guatemala	Spanish
Honduras	Spanish
Hong Kong	English
Japan	Japanese
Mexico	Spanish
Panama	Spanish
Paraguay	Spanish
Peru	Spanish
Uruguay	Spanish
Venezuela	Spanish

See "Specify" below if you desire a different machine nomenclature than is shown for your country.

If your country is not listed above, the default language is English.

HDA Data Recovery: (Plant only) Should data in the field prove unrecoverable, data recovery assistance at an IBM Plant will be provided. The customer is required to provide a sufficient number of the appropriate media to contain recovered data when returning the Head and Disk Assembly to the plant for data recovery.

SPECIFY

- Power Cable: A 2m power cable to plug the 9335 into a 9309 Rack Enclosure will be supplied with a field add-on unit.
- Voltage: The 9335 will be shipped with a power supply which is rated at 200-240V, 50/60 Hz. The power source will be supplied by the 9309 Rack Enclosure.
- Color: The color of the covers will be pearl white. No specify code is required.
- Mounting Rails:
 - Units which are shipped in a 9309 Rack Enclosure will be mounted.
 - For units ordered for field installation in a 9309 Rack Enclosure the appropriate mounting rails for mounting the 9335 in the Enclosure will be shipped with the 9335.
- Specify codes are required for the following items on the System/38:
 - Field installed machines
 - System Attachment
 - Signal cables for Model number order entry.
 - Non-standard machine language nomenclature.

- Field Installation Machines: Specify #9902 to indicate that the 9335 is for field installation in a customer's existing 9309 Rack Enclosure; therefore, integration at the assembly plant is not required.

- System Attachment: Specify one of the following to indicate to what type of system the 9335 will be attached.

- Specify #9990 for System/38 Attachment. This is the default.

- Specify #9991 for 9370 Information System Attachment. This code will be supplied by the CF9370 configurator on HONE.

- Signal Cables:

- Signal cable lengths must be specified when ordering a 9335 as a field add-on device for either the 9370 Information System or System/38.

- Do not specify a cable longer than is required. Space restrictions in a 9309 Rack Enclosure will inhibit installation of a machine with excess cable.

- Specify codes for cables are as follows:

Specify Code	Mdl A01 to Proc cable	Mdl A01 to Mdl A01 cable
#9802	1.5m (4.9 ft)	N/A
#9803	2.5m (8.2 ft)	2.5m (8.2 ft)
#9804	4.0m (13.1 ft)	4.0m (13.1 ft)
#9805	6.0m (19.7 ft)	6.0m (19.7 ft)
#9806	10.0m (32.8 ft)	10.0m (32.8 ft)
#9807	20.0m (65.6 ft)	20.0m (65.6 ft)
#9808	30.0m (98.4 ft)	30.0m (98.4 ft)
#9809	40.0m (131.2 ft)	40.0m (131.2 ft)
#9810	60.0m (196.8 ft)	60.0m (196.8 ft)

Mdl A01 to Mdl B01 cable

#9821	3.5m (11.5 ft)
#9822	6.0m (19.7 ft)

For additional or replacement signal cables see "Accessories".

The maximum distance from the system DASD adapter to the terminator on the last Model A01 in a signal cable path is 75m (246 ft).

- Language Groups: Non-standard machine language nomenclature specify codes are as follows:

English US	#2924
French	#2928
Canadian French	#2935
German	#2929
Japanese	#2930
Spanish	#2931

SPECIAL FEATURES (NONE)

ACCESSORIES

A signal cable is supplied with the 9335. Additional or replacement signal cables are available for purchase.

	Length	P/N
Signal Cable	1.5m (4.9 ft)	6495254
Signal Cable	2.5m (8.2 ft)	6495250
Signal Cable	4.0m (13.1 ft)	6495252
Signal Cable	6.0m (19.7 ft)	6495251
Signal Cable	10.0m (32.8 ft)	6495255

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Signal Cable	20.0m (65.6 ft)	6495256
Signal Cable	30.0m (98.4 ft)	6495257
Signal Cable	40.0m (131.2 ft)	6495258
Signal Cable	60.0m (196.8 ft)	6495264
Signal Cable (A to B)	3.5m (11.5 ft)	6200612
Signal Cable (A to B)	6.0m (19.7 ft)	6200613

Order desired cable via MSORDER (Category =
Accessories/Supplies) on AAS to the Rochester plant. Specify part
number desired.

SUPPLIES (NONE)

9347 MAGNETIC TAPE DRIVE

PURPOSE

The 9347 Magnetic Tape Drive is a compact, streaming tape drive that attaches to the 9370 Series Processors and mounts in the 9309 Rack Enclosure. The 9347 autoloads reels of industry standard 1/2 inch magnetic tape. The 9347 records or reads data at 1600 bpi at a data rate of either 40 or 160KB per second.

Refer to M9370 Processor pages for supported configurations.

MODELS

Model 001

Limitations: The 9347 Magnetic Tape Drive is limited to the IBM-defined environment: Class A2 Extended (media limitation).

Maximums: Refer to M9370 Processor pages for the maximum number of devices and the configurations supported by the system.

Prerequisites:

- DASD/Tape Subsystem Controller (Feature #6010) on 9370 Processor.
- Configuration space in a 9309 Rack Enclosure is required. The 9347 occupies five EIA units of space in the rack. See M9309 pages.

Customer Responsibilities: The 9347 Magnetic Tape Drive will be installed by IBM. However, the customer will continue to be responsible for systems installation planning activity. These activities will include but are not limited to:

1. Determining system configuration requirements.
2. Positioning the rack and associated products in the location for installation by IBM.
3. Ensuring the correct power and space is available prior to installation.

HIGHLIGHTS

Streaming Tape Drive

- Compact design and packaging
- Rack enclosure mounting
- Autoloading
- Industry standard 1/2 inch tape
- ANSI standard system interface (IBM IPI-3)
- Self-diagnosis maintenance function
- National Language Support

Physical specifications:

Width - 432mm (17 in.)
 Height - 222mm (8.75 in.)
 Depth - 559mm (22 in.)
 Weight - 37.0Kg (82 lbs)

Operating environment:

IBM 9347 Magnetic Tape Drive--Class A2 Extended (media limitation)

Temperature: 15.6 to 32.2 degrees C (60-90 degrees F)
 Relative Humidity: 20 to 80%
 Wet bulb: 22.8 degrees C (73 degrees F)

Publications: The following publications are shipped with the product:

- "IBM 9347 Setting Up" SA21-9528
- "IBM 9347 Operating" SA21-9529
- "IBM 9347 Reference Code Guide" SA21-9838
- "IBM 9347 Analyzing Problems" SA21-9839
- "IBM 9347 Service Guide" SY31-9030

Additional copies are available from Mechanicsburg.

Order Number	Language	Title
SA09-0396	Canadian French	IBM 9347 Setting Up
SA09-0397	Canadian French	IBM 9347 Operating
T:SA21-9528	Chinese (Taiwan)	IBM 9347 Setting Up
T:SA21-9529	Chinese (Taiwan)	IBM 9347 Operating
T:SA21-9838	Chinese (Taiwan)	IBM 9347 Reference Code Guide
T:SA21-9839	Chinese (Taiwan)	IBM 9347 Analyzing Problems
N:SA21-9528	Japanese (Kanji)	IBM 9347 Setting Up
N:SA21-9529	Japanese (Kanji)	IBM 9347 Operating
N:SA21-9838	Japanese (Kanji)	IBM 9347 Reference Code Guide
N:SA21-9839	Japanese (Kanji)	IBM 9347 Analyzing Problems
SA10-0146	Spanish	IBM 9347 Setting Up
SA10-0147	Spanish	IBM 9347 Operating
SA10-0077	Spanish	IBM 9347 Analyzing Problems

DESCRIPTION

The 9347 is a compact streaming tape drive that uses industry standard 1/2 inch-wide magnetic tape and mounts in the 9309 Rack Enclosure. The 9347 autoloads standard reels that are 7, 8.5, and 10.5 inches in diameter. The 9347 records or reads data at 1600 bpi (phase encoded--ANSI) at a tape speed of either 25 inch or 100 inch per second (ips). This allows an instantaneous data rate of 40KB per second at 25 ips or 160KB per second at 100 ips. A full 2400 foot reel of tape (10.5-inch reel) can hold approximately 40MB.

This device is equipped with a high level system interface (IBM IPI-3) which provides a high degree of host independence. A self-diagnosing maintenance function is incorporated in the 9347. The maintenance function may be invoked locally or from the host system. Integrated power-on testing and backup diagnostics provide individual FRU (Field Replaceable Unit) or FRU Group Isolation.

National Language Support: Support information for the 9347, consisting of safety labels, other nomenclature (such as operator pan-

els), and documentation will be available in national languages as shown in the following table.

National Language	Safety Labels	Nomenclature	Documents	Notes
Belgian-Dutch	X	---	X	1
Belgian-French	X	---	X	1
Canadian-French	X	X	X	2
Chinese (for Taiwan)	---	---	X	
Danish	X	---	X	
Dutch	X	---	---	
Finish	X	---	---	
French	X	X	X	
German	X	X	X	
Italian	X	X	X	
Japanese (Kanji)	X	X	X	
Korean (Hanguel)	X	---	---	
Norwegian	X	---	---	
Portuguese	X	---	---	
Spanish	X	X	X	3
Swedish	X	---	X	
Swiss-Fr/Ger/Italian	X	X	X	4
UK English	---	---	X	

(X = NL available; --- = US English)

Notes:

- Safety labels for Belgium are Dutch/French bilingual.
- Safety labels for Canada are Canadian-French/English bilingual.
- Spanish information is for both Spain and Latin American Spanish-speaking countries.
- French, German, and Italian versions of the documents will be shipped with each device to Switzerland. Safety labels are multilingual. Nomenclature is German.

SPECIFY

Unless indicated otherwise, these specify features are available only at time of manufacture.

- Default Order Entry: With the exception of signal cables, specify codes are not required when ordering a 9347. Appropriate signal cables MUST be specified. Specify codes may be used to request a machine language other than the default language.
- Voltage: The 9347 will be shipped with a Worldwide applicable power supply. No Specify code is required.
- Power Cord: The power cord supplied will be as follows:
 - A standard 2m (6.6 ft.) cord will be supplied. The cord is pluggable at the 9347 and also provides a convenient power plug meant specifically for the power strip provided in the 9309 Rack Enclosure. No Specify code is required.
- Machine Nomenclature: Specification of nomenclature is optional. The default language is determined by country origin of the order, as shown in the following table:

Ordering Country	Nomenclature
Argentina	Spanish
Australia	English
Canada	English
Colombia	Spanish
Hong Kong	English
Japan	Japanese (Kanji)
Korea	English
Mexico	Spanish

Taiwan
Venezuela

English
Spanish

If your country is not listed or if you desire a different machine language than is shown for your country, specify one of the codes below to override the default.

Specify Code	Machine Nomenclature
#2924	English US
#2928	French
#2929	German
#2930	Japanese (Kanji)
#2931	Spanish
#2932	Italian
#2935	Canadian French

Signal Cables:

- The required signal cable must be specified depending on the customers system configuration. The appropriate cables must be specified on the 9347 order and will be shipped with machines.
- Do not specify a cable longer than is required. Space restrictions in a 9309 Rack Enclosure will inhibit installation of the machine with excess cable.
- Use one of the following codes when ordering a 9347:

Feature Code	Signal Cable Length
#9802	1.5m (4.9 ft.)
#9803	2.5m (8.2 ft.)
#9804	4.0m (13.1 ft.)
#9805	6.0m (19.7 ft.)

Other Signal Cables:

- One of the above length signal cables will be supplied as specified.
- For additional or replacement signal cables see "Accessories".

Field Setup Desired (#9902). Use this specify code to indicate (1) that the machine is for field setup in a customer's existing Rack En-

MACHINES

closure and/or (2) is not to be installed in a Rack Enclosure for which there is an accompanying order.

Signal Cable	4.0m (13.1 ft)	6495252
Signal Cable	6.0m (19.7 ft)	6495251

Order desired cable via MSORDER (Category = Accessories/Supplies) on AAS to the Rochester plant. Specify part number desired.

SPECIAL FEATURES (NONE)

MODEL CONVERSIONS (NOT APPLICABLE)

MACHINE ELEMENTS (NONE)

ACCESSORIES

A signal cable is supplied with the 9347. Additional or replacement signal cables are available for purchase:

	Length	P/N
Signal Cable	1.5m (4.9 ft)	6495254
Signal Cable	2.5m (8.2 ft)	6495250

SUPPLIES

Tape Cleaning Kit: P/N 352465

Cleaning Fluid: P/N 8493001

Lint-Free Cloth: P/N 2108930

9347 MAGNETIC TAPE DRIVE PRODUCT SPECIFICATION**DESCRIPTION**

The 9347 is a compact streaming tape drive that uses industry standard 1/2 inch-wide magnetic tape and mounts in the 9309 Rack Enclosure. The 9347 autoloads standard reels that are 7, 8.5, and 10.5 in. in diameter. The 9347 records or reads data at 1600 bpi (phase encoded--ANSI) at a tape speed of either 25 in. or 100 in. per second (ips). This allows an instantaneous data rate of 40KB per second at 25 ips or 160KB per second at 100 ips. A full 2400 ft. reel of tape (10.5 in. reel) can hold approximately 40MB.

This device is equipped with a high level system interface (IBM IPI-3) which provides a high degree of host independence. A self-diagnosing maintenance function is incorporated in the 9347. The maintenance function may be invoked locally or from the host system. Integrated power-on testing and backup diagnostics provide individual FRU (Field Replaceable Unit) or FRU Group Isolation.

Physical characteristics:

Width - 432mm (17 in.)
Height - 222mm (8.75 in.)
Depth - 559mm (22 in.)
Weight - 37.0Kg (82 lbs)

Heat Output - 270 watts
Power Requirements - 0.3 KVA (50/60 Hz)

SPECIFIED OPERATING ENVIRONMENT

IBM 9347 Magnetic Tape Drive--Class A2 Extended (media limitation)

Temperature: 15.6 to 32.2 degrees C (60-90 degrees F)
Relative Humidity: 20 to 80%
Wet bulb: 22.8 degrees C (73 degrees F)

Machine Requirements: The 9347 attaches to the DASD/Tape Sub-system Controller (#6010) on the 9370 Processor.

Programming Requirements: Support for the 9347 will be provided by:

VM: VM/SP Releases 4 and 5 via updates supplied by the Service Process in 1Q87. APAR numbers will be provided at the time of General Availability for the 9347. VM/SP HPO will not support the 9347.

VSE: VSE/SP Version 2.1.6; VSE/SP Version 3.1.1.

9370 PROCESSORS

9373 PROCESSOR

9375 PROCESSOR

9377 PROCESSOR

PURPOSE

The 9370 Processor Family offers the modularity, flexibility, openness, and computational performance typically associated with supermini computers, at a superior level of price/performance.

The rack-mountable 9370 processor is uniquely designed for an office environment, having low floor space and power requirements, low acoustics, and an attractive, modular, systems package.

The 9370 processor family offers System/370 architecture at an entry price previously unavailable.

MODELS

The 9370 Processors are a family comprised of three machine types:

9373 Model 20

9375 Models 40 and 60: The 9375 Model 40 processor is field upgradeable to the 9375 Model 60 processor; and, systems with either Model of the 9375 processor can be field converted to the 9377 processor. The 9375 Model 60 processor offers improved performance over the 9375 Model 40 processor.

9377 Model 90

Limitations: The 9370 processor unit and console are limited to the IBM-defined environment listed below:

IBM 9373 Processor Unit: Class C
IBM 9375 Processor Unit: Class C
IBM 9377 Processor Unit: Class B Extended
IBM 9370 Processor Console: Class B

Each 9370 processor has a processor console which is not rack-mountable. It is to be placed on a flat surface (such as a table) outside the rack enclosures, and must be located within 8m (26 ft.) of the 9370 Processor.

The 9370 Processor Console is the same for all three members of the family.

The 9370 processors may use a maximum total of 16 of the following integrated controllers:

- System/370 Block Multiplexer Channel (#6003)
- DASD/Tape Subsystem Controller (#6010)
- Work Station Subsystem Controller (#6020)
- Communications Processor (#6030)

The 9370 processors reserve some of the capacity of 9335 and 9332 DASD for system use. Therefore, when attached to 9370 processors, the usable capacity of the 9335-B01 DASD is 824 MB (physical capacity is 855.8 MB) and the usable capacity of the 9332-400 DASD is 368 MB (physical capacity is 400.6 MB).

Prerequisites: The 9370 processors using one or more of the following integrated controllers must have one DASD attached via the DASD/Tape Subsystem Controller (#6010) in order to store and load microcode:

- DASD/Tape Subsystem Controller (#6010)
- Work Station Subsystem Controller (#6020)
- Communications Processor (#6030)

All orders and alterations for 9370 processors and associated rack-mounted devices MUST be configured and validated using the CF9370 configurator on HONE. Orders not validated by this configurator may be rejected at time of manufacture.

HIGHLIGHTS

- Office Environment Compatibility
- New System Packaging Technology
- System/370 Compatibility
- Integrated I/O Controller Structure
- Multi-Member Family
- Reliability, Availability, and Serviceability
- Task-Oriented System Library
- National Language Support

Physical Specifications: The physical dimensions of the 9370 processor units and rack-mountable features are as follows:

Machine Type / Feature Code	EIA Units	Height mm (inches)	Width mm (inches)	Depth mm (inches)	Weight kg (lbs)
9373	8	356 (14)	483 (19)	711 (28)	60 (132)
9375	16	711 (28)	483 (19)	782 (31)	127 (280)
9377	16	711 (28)	483 (19)	782 (31)	122 (268)
#5010	8	356 (14)	483 (19)	622 (24)	41 (90)
#5020	8	356 (14)	483 (19)	622 (24)	41 (90)
#6001	2	89 (3.5)	483 (19)	152 (6)	7 (15)

EIA Units given for the System/370 Channel Power Control (#6001) feature are for the 9309 Model 1 Rack Enclosure only. In the 9309

Model 2 Rack Enclosure, this feature mounts vertically in the recess above the power control compartment.

One EIA (Electronic Industries Association) unit = 4.445 cm (1.75 in.).

Operating Environment:

IBM 9373 and 9375 Processors - Class C

Temperature: 10 to 40.6C (50 to 105F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 26.7C (80F)

IBM 9377 Processor - Class B Extended

Temperature: 10 to 32.2C (50 to 90F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8C (73F)

IBM 9370 Processor Console - Class B

Temperature: 15.6 to 32.2C (60 to 90F)
Relative Humidity: 8 to 80 percent
Wet Bulb: 22.8C (73F)

Customer Responsibilities: The 9370 Processors will be installed by IBM. However, the customer will continue to be responsible for systems installation planning activity. These activities will include but are not limited to:

1. Determining system configuration requirements.
2. Positioning the rack and associated products in the location for installation by IBM.
3. Ensuring the correct power and space is available prior to installation.

Publications: The 9370 Information System publications are grouped into three libraries: User, Service, and Reference.

The User Library contains the common publications needed to learn about, plan for, set up, and operate the system. It includes publications for use before the arrival of the 9370 Information System and also publications which are shipped with the system.

The following publications in the IBM 9370 Information System User Library are available from Mechanicsburg. To order, contact your IBM representative.

- "Introducing the IBM 9370 System" GA24-4030
- "Planning for Your System" GA24-4032
- "Installation Manual - Physical Planning" GA24-4031
- "Planning Forms" GX24-4093
- "IBM 9309 Rack Enclosure Physical Planning Template (English units)" GX24-4046
- "IBM 9309 Rack Enclosure Physical Planning Template (Metric units)" GX24-4047
- "Tabs" GX24-4097
- "Planning Binder (1-3/4 in.)" GX24-4098

The last seven items on the above list may be ordered as a kit by using one order number, GK2T-0822.

Order Number	Language
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Title: Introducing the IBM 9370 System	
GA09-0293	Canadian French
T:GA24-4030	Chinese (Taiwan)
GA11-0417	French
GA12-2796	German
K:GA24-4030	Korean (Hanguel)
GA13-1239	Italian
N:GA24-4030	Japanese (Kanji)
GA10-8434	Spanish

Title: Planning for Your System	
T:GA24-4032	Chinese (Taiwan)
GA11-0419	French
GA12-2845	German

K:GA24-4032	Korean (Hanguel)
GA13-1237	Italian
N:GA24-4032	Japanese (Kanji)
GA15-3811	Norwegian
GA10-8436	Spanish
GU21-4010	UK English

Title: Installation Manual - Physical Planning

T:GA24-4031	Chinese (Taiwan)
GA11-0418	French
K:GA24-4031	Korean (Hanguel)
GA13-1238	Italian
N:GA24-4031	Japanese (Kanji)
GA15-3810	Norwegian
GA10-8435	Spanish

Title: Planning Forms

T:GX24-4093	Chinese (Taiwan)
GX12-1807	German
K:GX24-4093	Korean (Hanguel)
GX13-1574	Italian
N:GX24-4093	Japanese (Kanji)

Title: IBM 9309 Rack Enclosure Physical Planning Template (English Units)

GX11-0125	French
GX12-1747	German
GX13-3047	Norwegian
GU21-6010	UK English

Title: IBM 9309 Rack Enclosure Physical Planning Template (Metric Units)

GX09-0136	Canadian-French
N:GX24-4047	Japanese (Kanji)
GX10-8383	Spanish
GX11-0126	French
GX12-1748	German
GX13-1562	Italian
GX13-3048	Norwegian
GX10-8383	Spanish

Title: Tabs

T:GX24-4097	Chinese (Taiwan)
K:GX24-4097	Korean (Hanguel)
GX13-1576	Italian
N:GX24-4097	Japanese (Kanji)
GX10-8395	Spanish

Title: Planning Binder

T:GX24-4098	Chinese (Taiwan)
K:GX24-4098	Korean (Hanguel)
GX13-1575	Italian
N:GX24-4098	Japanese (Kanji)
GX10-8396	Spanish

The Service Library contains maintenance information and procedures. The publications included in this library depend on the system processor type. The appropriate Service Library is shipped with the system.

Reference Library publications and binders will be available for purchase at general availability. The Reference Library includes specialized information for programmers and analysts. The publications in this library provide detailed information about various system features and subsystems. See your IBM representative for availability.

In addition to the 9370 Information System Library, each rack-mounted device is supported by its own Product Library. One set of product documentation is shipped to support each device type in a customer's system.

DESCRIPTION

Office Environment Compatibility: The 9370 processors and system I/O may be configured with no raised floor requirement. When mounted in the 9309 rack enclosure, temperature and humidity requirements and noise levels are compatible with normal office environments. The 9370 processors and the 9309 rack enclosure use single phase power.

New System Packaging Technology: Memory and integrated I/O controllers in the 9370 processors are packaged on logic cards. On the 9373 and 9375 processors, these cards fit into slots inside the processor unit. On the 9377 processor, the memory cards fit into slots inside the processor unit; however, the integrated I/O controllers reside in slots in a separate I/O card unit, which may be mounted in the same or an adjacent rack enclosure. The cards are flat (191 mm by 203 mm by 16 or 27 mm) and are enclosed in a protective casing.

System/370 Compatibility: The 9370 processors use the proven IBM System/370 architecture. This compatibility allows the use of conventional System/370 operating systems and protects the investment of users with System/370 application programs. The 9370 processors offer the full System/370 instruction set, 16 general purpose registers, and the Virtual Memory capability associated with the System/370 architecture. They all support the performance enhancements of ECPS:VM and Assist for IX/370 (IXA); and the 9375 Model 60 and 9377 processors support ECPS:MVS. All integrated I/O is compatible with the System/370 I/O structure of Channel and Control Unit. For purposes of attachment of channel control units and their devices, a System/370 Block Multiplexer channel is available.

The 9370 processor console provides System/370 manual operations, such as display/alter memory, set address stop, and others.

Integrated I/O Controller Structure: The 9370 Processors can be configured with integrated controllers for the attachment of rack-mountable DASD and tape devices; a 3270 Information Display work station subsystem controller which also supports the serial original equipment manufacturer's interface (SOEMI); and communications subsystems which support synchronous and asynchronous lines with various protocols, ASCII devices in native, ASCII/3270 conversion, and transparent modes, and attachment to local area networks compatible with the IEEE 802.3 (CSMA/CD) and 802.5 (IBM Token-Ring) standards.

The 9370 processors have a new, integrated I/O controller structure. The terms used to briefly describe this structure are Device, Adapter, and I/O Processor. A Device is attached to an Adapter which communicates to an I/O Processor. The I/O Processor provides the means to handle I/O commands from the processor and to pass data to processor memory.

Multi-Member Family: The processors in the 9370 family cover the following memory and DASD ranges:

MINIMUM/MAXIMUM				
9332 or 9335				
MEMORY (Megabytes)	Internal		DASD	
	I/O Buses	I/O Card Slots	Attachable	
9373-20	4/16	1	7	368/6592
9375-40	8/16	4	17	368/13184
9375-60	8/16	4	17	368/13184
9377-90	8/16	2/6	10/54	368/39552

Each processor is a rack-mountable unit and provides modularity for flexible upgrading. The mounting space required in the rack is described in Electronic Industries Association (EIA) units. One EIA unit = 4.445 cm (1.75 in.).

- The 9373 processor is the entry level 9370 processor. It provides an aggregate I/O capacity estimated at up to 5.5 megabytes per second. I/O slots for the attachment of up to 7 card features are provided inside the 9373 processor unit.

- The two Models of the 9375 processor each provide an aggregate I/O capacity estimated at up to 22.0 megabytes per second. I/O slots for the attachment of up to 17 card features are provided inside the 9375 processor unit.
- The 9377 processor is the most powerful 9370 processor. It offers an aggregate I/O capacity estimated at up to 39.0 megabytes per second. The 9370 card features, except memory, are attached via an I/O Card Unit, which is a rack-mountable unit separate from the 9377 processor unit. The number of I/O Card slots is variable from 10 to 54 and is dependent on the configuration chosen.

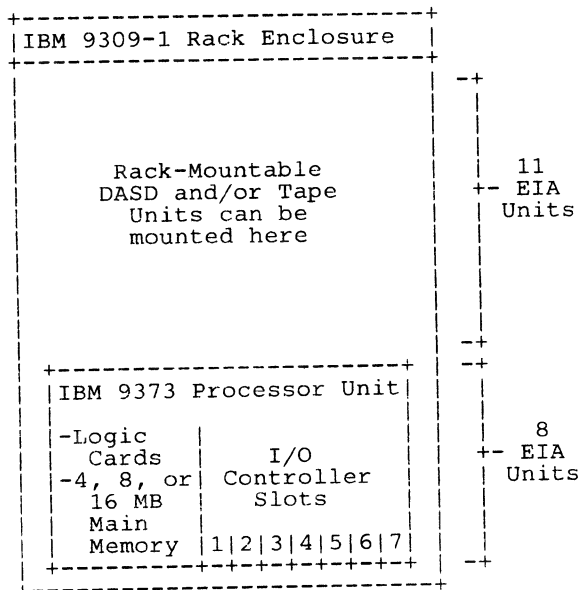
9373 PROCESSOR HIGHLIGHTS

- Entry level member of the IBM 9370 family
- Compact physical size
- 7 slots for I/O controller features
- 4, 8, and 16 MB Memory Options

The 9373 processor is the entry level 9370 processor.

The 9373 processor provides seven slots in the processor unit to house up to seven integrated I/O controller card features.

The 9373 processor is packaged in an 8-EIA-unit rack-mountable module. This compact design means that the processor, two 9332-400 DASD, and a 9347 magnetic tape unit can all be mounted in a single 1.0m 9309 Model 1 rack enclosure. Below is a diagram which indicates the position a 9373 processor would occupy in a 9309 Model 1 Rack Enclosure.



9375 PROCESSOR HIGHLIGHTS

- Intermediate member of the IBM 9370 family
- Two performance Models with field upgradeability
- High Performance Arithmetic Unit
- 17 slots for I/O controller features
- 8 and 16 MB Memory Options

The 9375 processor is the intermediate level 9370 processor. There are two Models of the 9375 processors, Models 40 and 60. The 9375 Model 40 processor offers the same commercial processing power as the 9373 processor. The 9375 Model 40 processor offers additional configurability and additional processor performance in a compute-intensive or engineering/scientific environment. In a compute-intensive environment the processor throughput of the 9375 Model 40 processor has been measured at up to 1.4 times the 9373 processor.

The system throughput of the 9375 Model 60 processor has been measured by IBM as 2.4 times the 9375 Model 40 processor for commercial processing. In a compute-intensive or engineering/scientific environment, the processor throughput was measured at 2.0 to 2.7 times the 9375 Model 40 processor.

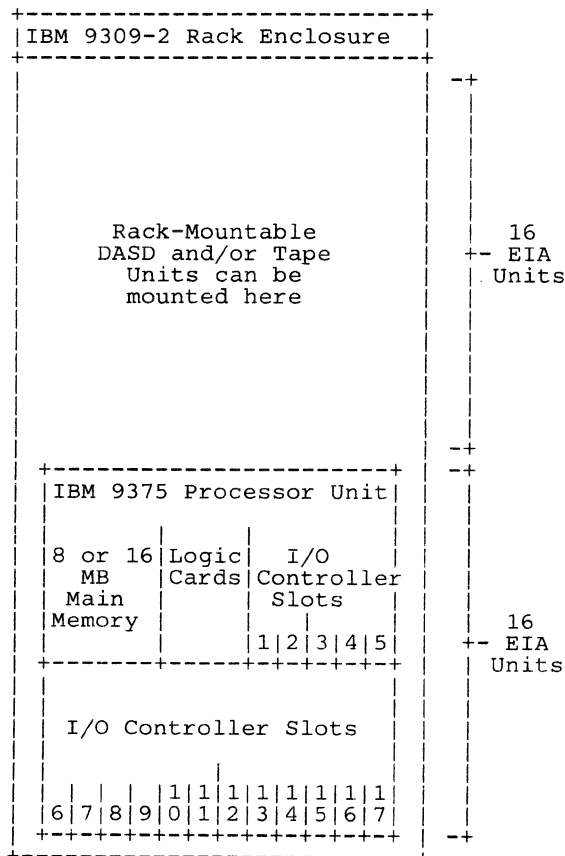
The 9375 Model 40 processor may be upgraded in the field to the 9375 Model 60 processor; and, either Model of the 9375 processor may be converted in the field to the 9377 Model 90 processor.

Seventeen integrated I/O controller slots are provided inside the 9375 processor.

The High Performance Arithmetic Unit provides hardware support for single and double precision floating point operations. It contains eight 64-bit floating point registers, and provides hardware for addition, subtraction, multiplication, division, and square root.

The 9375 processor is packaged in a 16-EIA-unit rack-mountable module. The processor, a 9335 DASD subsystem with 824 megabytes of DASD, and a 9347 tape drive can all be mounted in a single 1.6m 9309 Model 2 Rack Enclosure.

Below is a diagram which indicates the position a 9375 processor would occupy in a 9309 Model 2 Rack Enclosure.



9377 PROCESSOR HIGHLIGHTS

- Most powerful system in the 9370 processor family
- Air-cooled Thermal Conduction Module (TCM) technology processor
- Floating Point Accelerator hardware
- High Accuracy Arithmetic Facility (ACRITH)
- Field conversion from 9375 processors
- 10 to 54 slots for I/O controller features
- 8 and 16 MB Memory Options

The 9377 processor is the most powerful system in the 9370 processor family. The system throughput of the 9377 processor has been estimated by IBM to be 2.1 times the 9375 Model 60 processor in commercial processing. In a compute-intensive or engineering/scientific environment, the processor throughput of the 9377 processor was measured at 1.9 times the 9375 Model 60 processor for short precision floating point and 2.0 times the 9375 Model 60 processor for long precision floating point.

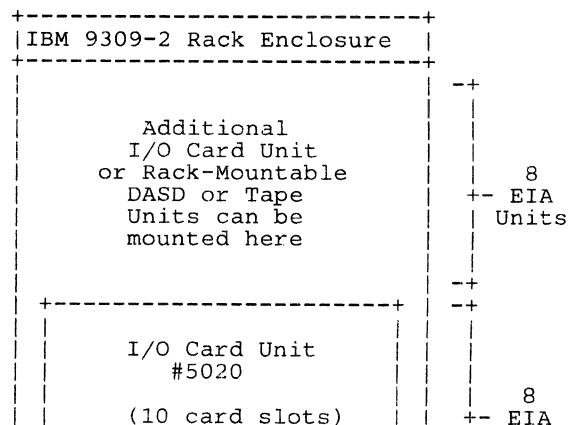
The 9377 processor logic is housed inside a TCM which implements an air-cooled design. Neither raised floor construction nor special electrical or plumbing considerations are required for any of the 9370 processors.

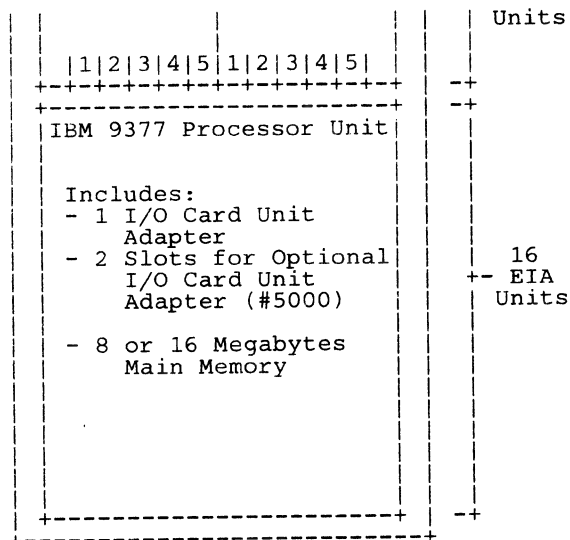
A floating point accelerator that executes Add, Subtract, Multiply, Divide, and Square Root long and short precision floating point instructions is provided in hardware on the 9377 processor. A High Accuracy Arithmetic facility (ACRITH) for solving problems in numerical analysis with verified accuracy and verified results is also standard.

I/O card slots for card features are provided separate from the 9377 processor unit via I/O Card Units #5010 and/or #5020. One #5020 I/O Card Unit is standard on the 9377 processor and provides ten I/O controller slots. Up to 44 I/O slots may be added via the I/O Card Unit features (#5000, #5010, and #5020), resulting in a maximum total of 54 slots per 9377 processor.

Field conversion is provided from the 9375 processor to the 9377 processor. The conversion includes the new 9377 processor with 8 megabytes of main memory, one I/O Card Unit Adapter, and one I/O Card Unit (#5020) with the associated cables. An additional rack is required. Existing card features from the 9375 processor are re-plugged into the new I/O Card Unit. Parts removed, including the 9375 processor unit with main memory, become the property of IBM and must be returned.

The 9377 processor is packaged in a 16-EIA-unit rack-mountable module. Below is a diagram which indicates the position a 9377 processor would occupy in a 9309 Model 2 Rack Enclosure.





Reliability, Availability, and Serviceability: The objective of the Reliability, Availability, and Serviceability (RAS) features of the 9370 processors is to reduce the frequency and impact of system interruptions that are caused by hardware failures. If a failure does occur, the RAS features reduce the time needed to locate and repair the malfunction.

Hardware reliability is enhanced through the use of reliable technologies and packaging. Hardware and program-supported facilities provide recovery to reduce the number of faults that can cause interruptions. Extensive diagnostic facilities that reduce problem location and repair time are provided.

RAS features include:

- Automated Problem Analysis Assistance
- Remote Service Facility
- Automated Configuration Assistance
- Automatic System Test (ST/9370)
- Extensive Microdiagnostics and System Reference Codes
- System/370 Manual Operations
- Exception and Error Logging
- OLTs/OLTEP

Automated Problem Analysis: The 9370 Processor Console can guide the user through problem determination procedures to isolate system problems. Remote Service Facility minimizes system downtime using the Processor Console's telephone connection. It offers the following advantages:

- Customer Problem Analysis (CPA) includes automated procedures for requesting IBM service.
- The Processor Console can communicate directly with an IBM support system where customer problem data can be analyzed and microcode updates can be transmitted to 9370 Information Systems (under warranty or IBM Maintenance Agreements) for immediate installation.
- Customers can allow IBM support experts to establish remote sessions with the Processor Console to facilitate complex problem analysis.
- Remote Service Facility insures that service is delivered as quickly as possible. In most cases where repair is required, an IBM Service Representative can be sent with the necessary parts and information to correct the problem in a single visit.

For Remote Service Facility, The customer must provide the telephone line and a standard telephone set and must arrange for the connection of the telephone interface cable provided by IBM to the telephone network.

(Japan only) The Processor Console includes a modem for this purpose. <)

(Except Japan) The customer must also provide an appropriate external modem. <)

Task-Oriented System Library: Use of the 9370 Information System is made easy by a newly designed, innovative library. The library is divided into three distinctive publications sublibraries: User, Service, and Reference.

All publications are designed to provide usability and retrievability of information. A new format that shows the hierarchy of headings on each page gives the reader a constant awareness of purpose and organization.

Procedural information is designed with a new format that makes step-by-step information usable by both novice and experienced users. A fast-track path gives the experienced user the information needed to quickly perform a task. Supplemental information and pictures are provided alongside each fast-track step to provide the detail needed by the novice user.

Besides the publications library, the 9370 processors have an online help facility. This provides easy access to information for use of manual functions screens and messages.

National Language Support: System support information for the 9370 processors, consisting of safety labels, other nomenclature (such as operator panels), documentation, machine-readable information (MRI), and Processor Console keyboards will be available in national languages as shown in the following table. Safety labels are available in all languages shown.

National Language MRI is in addition to English US MRI which is always present.

National Language	Nomenclature	Documentation	MRI	Key-Board
Belgian	X	X	Fren	X(1)
Canadian-French	X	X	-	X(2,3)
Chinese (Taiwan)	X	X	X	X(7)
Danish	X	X	-	X
Dutch	X	X	-	-
Finnish	X	-	-	-
French	X	X	X	X
German	X	X	X	X
Icelandic	-	-	-	X
Italian	X	X	X	X
Japanese (Kanji)	X	X	X	X
Korean (Hangul)	X	X	X	X(7)
Norwegian	X	X	-	X
Portuguese	X	X	-	X(4)
Spanish	X	X	X	X(5)
Swedish	X	X	-	X
Swiss German	X	German	Ger	X(6)
Swiss French	X	French	Fre	X(6)
Swiss Italian	X	Italian	Ital	X(6)
UK English	-	X	-	X

(X = NL available; - = US English)

Notes:

1. Safety labels, nomenclature, and CSU documentation for Belgium are Dutch/French bilingual. Remaining documentation is English US.
2. Safety labels for Canada are Canadian-French/English bilingual.
3. Canadian French machine nomenclature is French only, not bilingual.
4. Only the safety document, "Installing the Rack Stabilizer," will be available in Portuguese.
5. Spanish information is suitable for both Spain and Latin American Spanish-speaking countries.
6. Safety labels are trilingual. German, French, and Italian versions of safety documentation are shipped with every system.

in Switzerland. Other documentation and machine nomenclature are shipped in only one language: German, French, or Italian.

7. For Korea and Taiwan, national language support of machine nomenclature is for Safety Labels only.

Standard Features:

Processor Console: The Processor Console is the focal point for operation of the 9370 Information System.

Each 9370 processor includes a Processor Console. It is not rack-mountable, and requires a flat surface (table) for support.

The 9370 Processor Console is an independent processor which provides for the following functions:

- Configuration of the 9370 Processor and its I/O
- Customization of Integrated I/O Processors
- Initial Microcode Load for the 9370 Processor and System/370 Block Multiplexer Channel Feature
- Automated Problem Analysis Assistance
- System/370 Manual Operations
- System Power Control
- IBM 3270 Display Emulation
- Telephone connection to support remote facilities

The 9370 Processor Console must be attached to a 3270 control unit (the Work Station Subsystem Controller (#6020) or 3174 control unit for example) to use the 3270 Display Emulation. It must also be connected to a switched telephone line to provide the Remote Service Facility and Remote Operation Facility.

The 9370 Processor Console uses a specially configured IBM Personal Computer which is included with every 9370 Processor. This is done to assure the operation and integrity of each 9370 Information System. The functional and performance requirements of the 9370 Information System require the Processor Console functions to be implemented directly on the Personal Computer System hardware, bypassing normal Basic Input Output System (BIOS) conventions. A customer wanting to delete this IBM Personal Computer hardware from a 9370 Processor order should submit a Request for Price Quotation (RPQ) to IBM.

Remote Operation Facility: One challenge in managing or supporting multiple departmental or distributed systems is providing high quality technical support to systems that are geographically distant from each other. Pooling technical skills at a central site make sense from an economic standpoint, but leaves the problem of how to get this expertise to the systems when it is needed.

The Remote Operation Facility provides two functions that address this problem.

- Remote Access allows Processor Console functions to be accessed and operated through a switched telephone line by a Remote Operation Console. These functions include System Power Control, System/370 Manual Operations, 3270 Display Emulation, and Configuration and Customization Aids.
- Remote Operation Console allows one Processor Console to communicate with the Remote Access function of another.

Through the use of the Remote Operation Facility, extensive control over multiple 9370 Information Systems can be exercised from any one 9370 Information System.

Diskettes which will allow a PC/AT or 5550 to function as a Remote Operation Console will be available.

Automatic Restart after Power Failure: This function will automatically power-on the 9370 Information System after restoration of AC power following an outage of 500 milliseconds or more in duration.

Other Standard Features:

- System/370 Universal Instruction Set
- Virtual Memory Facility
- Time of Day Clock and Calendar

Software Requirements:

Operating Systems Support: The following programming support is provided for the 9370 processors. The support includes the integrated I/O controllers, the 9332 and 9335 DASD, and the 9347 tape drive, and the communications controller functions, except where noted.

Prior levels of operating systems are NOT supported by the 9370 processors.

VM: Support for all the 9370 processors is provided by:

- VM/SP Release 4 via the Service Process
- VM/Integrated System (VM/IS) Release 4
- VM/SP Release 5 via the Service Process
- VM/SP System Offering Release 5

This VM support will be available in third quarter, 1987.

VM support for the IBM Token-Ring Subsystem Controller (#6030 and #6034) will be initially available fourth quarter, 1987 in ACF/VTAM Version 3, in the then current release of TCP/IP, and in the TSAF virtual machine functions of VM/SP Release 5.

VM support for the IEEE 802.3 LAN Subsystem Controller (#6030 and #6035) will be initially available fourth quarter, 1987 in the then current release of TCP/IP, and in the TSAF virtual machine functions of VM/SP Release 5.

The following operating systems and their subsequent releases can run on the 9370 processors as VM guests:

- VM/SP Release 4
- VSE/SP Version 1 (included in VSE System IPO/E Version 1 Release 4.1)
- VSE/SP Version 2 Release 1 and VSE/SP Version 3 Release 1
- VSE System IPO/E Version 1 Release 3.1
- VSE/Advanced Functions Version 1 Release 3.0
- MVS/SP Version 1.3.5 (9375-60 and 9377-90 only)
- VS1 with BPE Version 4.0

Those VM guest operating systems that do not provide support for the 9370 processors or the rack-mountable DASD and tape must instead use DASD and tape attached via the System/370 channel. The devices attached must be supported by the guest operating system.

IX/370: Support will be provided in the fourth quarter, 1987. IX/370 requires VM.

The ASCII Subsystem Controller, consisting of the Communications Processor (#6030) and Asynchronous Adapters (#6032), can be used in place of the Series/1 and the IX/370 ASCII Control Feature for the attachment of ASCII terminals to IX/370.

IX/370 does not provide support for the Work Station Subsystem Controller (#6020); however, the IX/370 console can be attached to this feature.

IX/370 does not provide native support for the Multi-Protocol Two Line Communications Adapter (#6031). The local/remote file transfer function of IX/370 uses VM's support of this feature.

IX/370 does not provide support for the IBM Token-Ring Adapter (#6034) or the IEEE 802.3 LAN Adapter (#6035).

VSE: Support for the 9370 processors is provided by:

- VSE/Advanced Functions Version 2.1.6
- VSE/SP Version 2.1.6
- VSE/SP Version 3.1

This VSE support will be available in third quarter, 1987.

VSE/SP 2.1.6 requires a channel attached printer as system printer. With VSE/SP 3.1, system printers can attach via the Work Station Subsystem Controller (#6020) or the System/370 channel (#6003).

VSE does not provide support for the IBM Token-Ring Adapter (#6034) or the IEEE 802.3 LAN Adapter (#6035).

MVS: Support for the 9375 Model 60 and 9377 processors with System/370 channel-attached input/output devices is provided by:

- MVS/SP Version 1.3.5 with APAR #OZ98030 installed.

MVS does not support 9332 and 9335 DASD, the 9347 magnetic tape drive, or the 9370 integrated I/O controllers.

MVS support will be available fourth quarter, 1987.

Other System Software Support: Support for the appropriate release levels of VM, VSE, and MVS on 9370 processors is provided by the following required products:

- Current EREP release at the time of 9370 processor availability
- ICKDSF Release 8 with the following PTF's:
 - UD90143 - VSE (Generation system) (Pgm no. - 5747-DS2)
 - UD90144 - VSE (Production system) (Pgm no. - 5747-DS2)
 - UL90009 - Stand-alone (and VM) (Pgm no. - 5747-DS1)
 - No PTF required for MVS

SOEMI capability on the Work Station Subsystem Controller (#6020) is supported by the SOEMI Access Method Licensed Program (program number 5664-201 for VM and 5666-330 for VSE).

The High Accuracy Arithmetic Facility (ACRITH) of the 9377 processor is supported by the ACRITH subroutine library (program number 5664-185 for VM, 5666-320 for VSE, and 5665-337 for MVS).

The following VM optional products have been changed to support the 9370 processors:

- DIRMAINT
- IPF
- VM MAP
- VM RTM

Summary of Operating System Support of Attachment Features

	VM	IX/370	VSE	MVS
System/370 Block Multiplexer Channel (#6003)	Yes	Yes	(1)	Yes, Required
DASD/Tape Subsystem Controller (#6010)	Yes	Yes	Yes	No
Work Station Subsystem Controller (#6020)	Yes	(2)	Yes	No
Tele-Communications Subsystem Controller (#6030 & #6031 or #6032)	Yes	No	Yes	No
ASCII Subsystem Controller (#6030 and #6032)	Yes	Yes	Yes	No
IBM Token-Ring Subsystem Controller (#6030 and #6034)	Yes	No	No	No

IEEE 802.3 LAN Subsystem Controller (#6030 and #6035)

Yes	No	No	No
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Notes:

1. System/370 Channel (#6003) is required for system printer for VSE/SP 2.1.6; optional for VSE/SP 3.1.
2. Support is for attachment of the IX/370 console only.

Refer to the individual operating systems' documentation for the extent and mode of support.

SPECIFY

Unless indicated otherwise, these specify features are available only at time of manufacture.

- Power: Worldwide applicable power supply. No specify required.
- Color: Color is pearl white. No specify required.
- (AG only) Machine Nomenclature: Defaults for Nomenclature/Language are listed below:

Ordering Country	Default
Argentina	Spanish
Canada	English US
Colombia	Spanish
Mexico	Spanish
Venezuela	Spanish

If your country is not listed or if you desire a different machine language than is shown for your country, specify one of the order codes below.

#2924 - English US
#2931 - Spanish
#2935 - Canadian French
#2978 - Portuguese <

- (APG only) Machine Nomenclature: Defaults for Nomenclature/Language are listed below:

Ordering Country	Default
Australia	English US
Hong Kong	English US
Indonesia	English US
Japan	Japanese (Kanji)
Korea	Korean (Hangul)
Malaysia	English US
New Zealand	English US
Philippines	English US
Singapore	English US
Taiwan	Chinese
Thailand	English US

If your country is not listed or if you desire a different machine language than is shown for your country, specify the order code below.

#2924 - English US <

SPECIAL FEATURES

The following optional features can be attached to the 9370 processors. All are installed by IBM and are available on initial orders and as field upgrades.

MAIN MEMORY FEATURES

The 9370 processor main memory is packaged on logic cards which fit into slots inside each processor unit. Memory slots are separate from I/O controller slots on all the 9370 processors; therefore, the addition of main memory does not affect the number of card slots available for I/O controllers.

Four Megabyte Main Memory Addition (#4002): A 9373 processor with four megabytes of main memory can be upgraded to eight megabytes of main memory with this feature. On the 9373 processor, this feature is prerequisite for the eight megabyte main memory addition (#4008). Maximum main memory on the 9373 processor is 16 megabytes.

	9373	9375	9377
Limitations	None	NA	NA
Maximum additions per 9370 processor	1	NA	NA
Cable Order	None	NA	NA
Prerequisites	None	NA	NA
Field Installable	Yes	NA	NA

Eight Megabyte Main Memory Addition (#4008): Eight megabytes can be added to a 9373 or 9375 processor via this feature. On the 9373 processor, the four megabyte main memory addition (#4002) is a prerequisite for this feature. Maximum main memory on the 9373 and 9375 processors is 16 megabytes.

	9373	9375	9377
Limitations	None	None	NA
Maximum additions per 9370 processor	1	1	NA
Cable Order	None	None	NA
Prerequisites	#4002	None	NA
Field Installable	Yes	Yes	NA

Eight Megabyte Main Memory Addition (#4108): A 9377 processor with 8 megabytes of main memory may be upgraded via this feature to a maximum of 16 megabytes. This feature is only available on the 9377 processor.

	9373	9375	9377
Limitations	NA	NA	None
Maximum additions per 9370 processor	NA	NA	1
Cable Order	NA	NA	None
Prerequisites	NA	NA	None
Field Installable	NA	NA	Yes

I/O Card Unit Features (for IBM 9377 processors): The I/O Card Unit features provide I/O card slots for the 9377 processor.

Each I/O Card Unit (#5010 or #5020) attaches to the 9377 processor via an I/O Card Unit Adapter (#5000) and consists of a rack-mountable unit and connection hardware. The rack-mountable unit contains the I/O card slots.

There are two types of I/O Card Units: #5010 contains one internal I/O bus with 11 I/O card slots and #5020 contains two internal I/O buses with 10 I/O card slots (5 per bus).

The 9377 processor unit and the I/O Card Units may reside in separate racks. I/O Card Unit features cannot be shared by two or more 9377 processors.

I/O Card Unit Adapter (#5000): This card is required to connect the I/O Card Units, #5010 and #5020, to the 9377 processor. Each I/O Card Unit Adapter provides two attachment positions and can support either two #5010 I/O Card Units or one #5020 I/O Card Unit. This feature resides in the 9377 processor unit itself, not in the I/O Card Unit.

	9373	9375	9377
Limitations	NA	NA	None
Maximum additions per IBM 9370 processor	NA	NA	2
Cable Order	NA	NA	None
Prerequisites	NA	NA	None
Field Installable	NA	NA	Yes

Notes:

- One I/O Card Unit Adapter is standard. Two additional I/O Card Unit Adapters may be added.

I/O Card Unit (#5010): Provides one internal I/O bus and 11 I/O card slots for the 9377 processor. Includes a rack-mountable unit with 11 available I/O card slots and connection hardware.

	9373	9375	9377
Limitations	NA	NA	Note
Maximum additions per IBM 9370 processor	NA	NA	4
Cable Order	NA	NA	None
Prerequisites	NA	NA	#5000
Field Installable	NA	NA	Yes

Notes:

- Requires one (1) attachment position on the I/O Card Unit Adapter (#5000).
- Any of the 9370 device attachment card features except the System/370 Block Multiplexer Channel Card (#6003) can be inserted in this feature.
- The maximum number of internal I/O buses on the 9377 processor is six (6). Since feature #5010 provides one bus and #5020 provides two buses, any combination of these features that does not exceed six (6) is allowed.

I/O Card Unit (#5020): Provides two internal I/O buses with 10 I/O card slots (5 per bus) to the 9377 processor. Includes a rack-mountable unit and connection hardware.

	9373	9375	9377
Limitations	NA	NA	None
Maximum additions per IBM 9370 processor	NA	NA	2
Cable Order	NA	NA	None
Prerequisites	NA	NA	#5000
Field Installable	NA	NA	Yes

Notes:

1. One #5020 I/O Card Unit is standard on the 9377 processor.
2. Requires two (2) attachment positions on the I/O Card Unit Adapter (#5000).
3. Any of the 9370 device attachment card features, including the System/370 Block Multiplexer Channel Card (#6003), can be inserted in this feature.
4. The maximum number of internal I/O buses on the 9377 processor is six (6). Since I/O Card Unit #5010 provides one bus and #5020 provides two buses, any combination of these features that does not exceed six (6) is allowed.

permitted on the same internal I/O bus is two for the 9375 processor and three for the 9377 processor.

On the 9373 processor, the System/370 channel card is not permitted if two DASD/Tape Subsystem Controllers (#6010) are present.

On the 9375 processor, System/370 channel cards can be inserted only in the top card enclosure in the processor unit.

On the 9377 processor, System/370 channel cards can be inserted only in the #5020 I/O Card Unit.

The maximum number of System/370 channel cards in one 9309 rack enclosure is limited to eight.

The following products are supported via the System/370 Block Multiplexer Channel card:

DEVICE ATTACHMENT FEATURES

System/370 Block Multiplexer Channel (#6003): This feature consists of a single card containing a System/370 block multiplexer channel and associated connection hardware.

Rules for placement of this card in the 9370 processor or I/O Card Unit must be followed to prevent the maximum data transfer capability from being exceeded. Refer to "Planning for Your IBM 9370 System" (GA24-4032) for additional information. The System/370 Block Multiplexer Channel can be used in one of the following three environments:

- Environment 1: Devices with data transfer rates of up to 3 megabytes per second can be attached.
- Environment 2: Devices with data transfer rates of up to 1.9 megabytes per second can be attached.
- Environment 3: Devices, except DASD, with data transfer rates of up to 1.5 megabytes per second can be attached.

	9373	9375	9377
Limitations	See below		
Maximum per 9370 processor			
Environment 1	NA	2	12
Environment 2	NA	2	12
Environment 3	1	2	12
Cable Order	None	None	None
Prerequisites	1 slot	1 slot	1 slot #5020
Field Installable	Yes	Yes	Yes

System/370 channel cards of different environments can appear on the same internal I/O bus:

- The maximum number of Environment 1 System/370 channel cards permitted on the same internal I/O bus is one for the 9375 processor and two for the 9377 processor. The remaining I/O slots on the bus must then be left empty, thus reducing the number of usable slots.
- The maximum number of Environment 2 System/370 channel cards permitted on the same internal I/O bus is two. No DASD/Tape Subsystem Controller (#6010) can reside on the same internal I/O bus.

In addition, on the 9375 processor, neither the Communications Processor (#6030) nor the Work Station Subsystem Controller (#6020) can appear on the same bus.

On the 9377 processor, one Environment 3 channel card can appear on the same bus with two Environment 2 channel cards.

- The maximum combination of Environment 3 System/370 channel cards and DASD/Tape Subsystem Controllers (#6010)

Environment 1 2 3

3044-C01 (1)	X	X	X
3174	X	X	X
3203-5	X	X	X
3262-5	X	X	X
3274	X	X	X
3330 (2)	X	X	
3340 (2)	X	X	
3344 (2)	X	X	
3350 (2)	X	X	
3370 (2)	X	X	
3375 (2)	X	X	
3380 (2)	X		
3420 (2)	X	X	
3422	X	X	X
3430	X	X	X
3480	X	X	X
3705 (3)	X	X	X
3720 (3)	X	X	X
3725 (3)	X	X	X
3803	X	X	
3820	X	X	X
3880-1,2,4	X	X	
3880-3,21,23	X		
4245-1,12,20	X	X	X
4248	X	X	X
4381 CTCA	X	X	X
5080	X	X	X
7170	X	X	X
7171	X	X	X
SERIES/1	X	X	X

Notes:

1. The only device supported through the 3044 via this feature is the 4381 channel-to-channel-adaptor.
2. These devices are supported through control units attached to the System/370 Channel feature.
3. EP and PEP modes are not supported. Communications controllers must be run in NCP mode only.

The 9370 Processors do not support Direct Control/External Interrupt.

Refer to the current list of device support within the individual operating systems for mode and extent of I/O device support.

The channel interface cables connect to the channel card cables via a cable connection box. The connection of these cables is customer setup; however, System/370 equipment that will be attached to the channel may not be customer setup. See the "IBM 9370 System/370 Block Multiplexer Channel Description and Reference" and the "IBM 9370 Installation Manual - Physical Planning" (SA24-4031) for more information.

DASD/Tape Subsystem Controller (#6010): This feature is a single card providing DASD and tape attachment to the 9370 processor. It

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uses the IBM IPI-3 standard interface and allows attachment of 9332-400 DASD, 9335 DASD subsystems, and the 9347 tape drive.

	9373	9375	9377
Limitations	See table below for allowed configurations		

Maximum per 9370 processor	2	4	12
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Cable Order	None	None	None
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Prerequisites	1 slot	1 slot	1 slot
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Field Installable	Yes	Yes	Yes
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The following configurations of DASD and/or tape are the only ones allowed on the DASD/Tape Subsystem Controller. Each row represents one configuration.

9332-400	9335 A01	B01	9347	DASD Megabytes	DASD Actuators
1-4	-	-	-	368-1472	2 to 8
1-4	-	-	1	368-1472	2 to 8
-	1	1-4	-	824-3296	2 to 8
-	-	-	1	None	None

Notes:

1. This definition of DASD/Tape Subsystem Controller configurations is independent of the 9370 processor to which the DASD/Tape Subsystem Controller is attached.
2. The 9347 tape drive is recommended for low volume data environments. For best performance, it is recommended that the 9347 tape drive be attached to a dedicated DASD/Tape Subsystem Controller.

Work Station Subsystem Controller (#6020): This feature consists of an I/O Processor card and an Adapter card which together provide control and attachment of up to 32 IBM 3270 Information Display System displays, printers, and personal computers. The serial original equipment manufacturer's interface (SOEMI), which provides for attachment of a variety of non-IBM subsystems and devices, is also supported.

The Work Station I/O Processor card provides 32 device addresses which can be used to support Control Unit Terminals (CUT), Distributed Function Terminals (DFT), or SOEMI devices.

The Work Station Adapter card provides physical connection to IBM Cabling System and coaxial media, allowing the Work Station I/O Processor to communicate with the devices it controls. Six ports are provided to communicate directly with up to six displays, printers, work stations, or SOEMI devices. Up to four IBM 3299-2 or 3299-3 Terminal Multiplexers can be attached to the Adapter Card to increase the number of devices controlled by the Work Station Subsystem Controller to 32.

	9373	9375	9377
Limitations	See Note 1		

Maximum per 9370 processor	2	6	12
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Cable Order	None	None	None
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Prerequisites	-2 I/O card slots		
	-See Note 2		

Field Installable	Yes	Yes	Yes
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Notes:

9370 Processors

1. Ports 1 and 2 of the Work Station Subsystem Controller are disabled when a 3299 is connected to port 0.
2. Customization of the Work Station Subsystem Controller requires an IBM 3270 Information Display terminal in CUT mode.

The following IBM displays may be attached via this feature:

3178-C1, C2, C3, C4
3179-1, G1, G2
3180-1
3191-A1X, A2X, B1X, B2X
3193-1, 2
3194-H20, H50
3278-2, 3, 4, 5
3279-S2A, S2B, S3G, 2X, 3X
3290-220, 230, T30
5578

The following IBM printers may be attached via this feature:

3262-3, 13
3268-2, 2C
3287-1, 2, 1C, 2C
4214-1
4224-201, 202, 2E2, 2C2
4234-1
4245-D12, D20
4250-1
5210-G1, G2
5227-11

Intelligent Printer Data Stream (IPDS) is supported for the IBM 4224 Printer.

The 5540/5550/5560 with the 3274 Control Adapter Card may be attached via this feature.

The following IBM Personal Computers with the #5050 or #2507 3278/79 Emulation Adapter may be attached via this feature:

5150
5160-068, 078, 086, 087, 088, 089, 267, 268, 277
5170-068, 099, 239, 319, 339, 599, 739, 919, 939
5271
5273
5371
5373
6150-20, 25, A25
6151-10

The IBM PCs listed above are supported for attachment to the Work Station Subsystem Controller when configured to operate with the following:

- IBM Personal Computer 3278/3279 Emulation Control Program Version 2 (P/N 8665780)
- IBM PC 3270 Emulation Program, Entry Level (P/N 59X9904)
- IBM PC 3270 Emulation Program Version 3 (P/N 59X9969)
- IBM PC RT Personal Computer 3278/3279 Emulation Program (PP 5669-052)
- IBM Virtual Machine/Personal Computer Release 2 (P/N 6467040)
- Personal Services/PC Release 1.04 (P/N 6403826, or higher)
- VM Bond Release 2 (P/N 6467022)

The following enhanced language RPQs for the Work Station Subsystem Controller (#6020) provide keyboard support for CUT 3270 terminals. Refer to the corresponding RPQ DPT (Request for Price Quotation Description and Price Transmittal) for further information.

Canadian French 8K1382
Yugoslav 8D0304

COMMUNICATIONS SUBSYSTEMS

The following four subsystems are supported to provide a wide range of communication capabilities:

- Telecommunications Subsystem Controller

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MACHINES

- ASCII Subsystem Controller
- IBM Token-Ring Subsystem (IEEE 802.5) Controller
- IEEE 802.3 Local Area Network Subsystem Controller

All four subsystems are based on the same Communications Processor card, plus one or more Communications Adapter cards and the appropriate microcode to provide a specific communications subsystem. Multiples of the same subsystem or different subsystems can coexist on the same IBM 9370 Information System; however, each subsystem must have its own dedicated Communications Processor card.

Maximum per 9370 Processor:

9373 - 2
9375 - 4
9377 - 12

Telecommunications Subsystem Controller: Consists of the Communications Processor (#6030) and up to three Multi-Protocol Two Line Communications Adapters (#6031), or three Asynchronous Four Line Communications Adapters (#6032), or a combination of both.

The following table describes the interfaces, protocols, and line speeds available for an individual communication line that is supported by the Telecommunications Subsystem Controller.

Interface	Line Protocol	Line Speed (bps)
EIA RS-232-C/ CCITT V.24/ V.28	ASYNC BSC SDLC	75-19,200 600-19,200 600-19,200
EIA RS-422-A/ CCITT V.11	ASYNC BSC BSC/SDLC SDLC	75-19,200 2,400-19,200 600-19,200 2,400-64,000
EIA RS-366/ CCITT V.25	ASYNC BSC SDLC	75-19,200 600-19,200 600-19,200
CCITT V.35	BSC SDLC	2,400-19,200 2,400-64,000
CCITT X.21	SDLC HDLC/X.25	600-64,000 600-19,200

The maximum number of lines supported by one Telecommunications Subsystem Controller is dependent on the combination of protocols and line speeds selected and the number of I/O slots available. Below are examples of maximum combinations of various protocols and line speeds supported by a single Telecommunications Subsystem.

- One 64K bps line with SDLC protocol.
- Three 19.2K bps lines with SDLC protocol.
- Four SDLC and two BSC lines at 9.6K bps.
- Six 4.8K bps lines with any combination of SDLC, BSC, HDLC, or Async.

The tables below describe the line capacity of the Telecommunications Subsystem. A weighting factor is assigned to each combination of line speed and protocol. During concurrent operations the sum of all the lines selected may not exceed a weight factor of 100. Use the first table when the highest single line speed does not exceed 9,600 bps. Use the second table when the highest single line speed exceeds 9,600 bps.

Table 1

Maximum single line speed is NOT greater than 9,600 bps.

Line Speed

(bps) Selected	Weight Factor		
	SDLC	BSC, ASYNC, HDLC/X.25	
9,600	12	25	
4,800	7	12	
2,400	4	7	
1,200	2	4	
600	1	2	
75-300	1	1	

Table 2

When maximum single line speed is greater than 9,600 bps.

(bps) Selected	Weight Factor		
	BSC, ASYNC, HDLC/X.25	SDLC	
56,000-64,000	NA	100	
50,000	NA	87	
48,000	NA	84	
19,200	67	33	
14,400	50	25	
9,600	33	16	
4,800	16	9	
2,400	9	5	
1,200	5	3	
600	3	2	
75-300	2	1	

As shown, a mix of protocols and line speeds can be selected, but this will have an effect on the total number of lines available. Final selection should be based on more detailed information. See "Planning for your System" (GA24-4032), Chapter 4, Planning Your Communications.

ASCII Subsystem Controller: Consists of the Communications Processor (#6030) and up to four Asynchronous Four Line Communications Adapters (#6032). This provides support for up to 16 ASCII devices operating at 50 bps to 19.2K bps in full duplex mode on either local lines without modems, or switched and leased communications lines with modems. Three modes of operation are available:

- ASCII support.
- ASCII/3270 conversion.
- ASCII/3270 transparent mode.

In ASCII mode, all ASCII devices attached appear as native devices to software. This is supported by IX/370.

In ASCII/3270 conversion mode, all devices such as display terminals, printers, and personal computers appear to software as 3270 display terminals and printers. This mode is supported by VM and VSE. Productivity functions, including type-ahead keying, null/blank processing, and forward/backward tabbing, are provided.

The ASCII/3270 transparent mode allows data communications with plotters, graphic devices, and data acquisition systems via the 3270 datastream facility.

A user may switch between ASCII and 3270 sessions.

Performance of the subsystem is influenced by the line speeds, type of usage, and number of concurrently active ASCII devices. See "Planning For Your System" (GA24-4032) for additional information.

IBM Token-Ring Subsystem Controller: Consists of the Communications Processor (#6030) and one IBM Token-Ring Adapter (#6034). It provides access to a high-speed (4M bps) IBM Token-Ring Network compatible with the IEEE 802.5 standard for interconnecting information processing equipment. The network uses the IBM Cabling System, including Type 3 specified telephone media, for physical interconnection, and a token-ring access protocol for network traffic control. For details regarding the IBM Token-Ring Network, see the "IBM Token-Ring Network Introduction and Planning Guide" (GA27-3677).

IEEE 802.3 Local Area Network Subsystem Controller: Consists of the Communications Processor (#6030) and one IEEE 802.3 LAN Adapter (#6035). This subsystem controller is used for communicating with other IBM 9370 Information Systems, other vendors' systems, and workstations compatible with IEEE 802.3 standard or the Ethernet local area network. (Ethernet is a registered trademark of the XEROX corporation.) This subsystem controller supports a network with a transmission speed of 10M bps using Carrier Sense Multiple Access with Collision Detection (CSMA/CD). See "Planning For Your System" (GA24-4032) for additional information concerning transceiver requirements.

COMMUNICATIONS FEATURES

Communications Processor (#6030): The Communications Processor provides the basic control and common circuits for attachment of the Communications Adapter cards.

	9373	9375	9377
Limitations	None	None	None
Maximum per 9370 processor	2	4	12
Cable Order	None	None	None
Prerequisites	1 slot	1 slot	1 slot
Field Installable	Yes	Yes	Yes

Communications Adapter Cards: The following Communications Adapter cards can be attached to the Communications Processor (#6030):

- Multi-Protocol Two Line Communications Adapter (#6031)
- Asynchronous Four Line Communications Adapter (#6032)
- IBM Token Ring Adapter (#6034)
- IEEE 802.3 LAN Adapter (#6035)

Multi-Protocol Two Line Communications Adapter (#6031): Works with the Communications Processor (#6030) to provide the Telecommunications Subsystem Controller. This includes basic control, processing power, and common circuits for the attachment of communication lines or autocal equipment, operating in the following transmission modes: Binary Synchronous Communications (BSC), Asynchronous Communications (Start/Stop), Synchronous Data Link Control (SDLC), and High-level Data Link Control (HDLC). See table, Telecommunications Subsystem Controller for interface information. Digital Data Service (DDS) is supported via a stand-alone DCE attachment, i.e., 5821 IBM Data Service Unit/Channel Service Unit. Connection via 2-wire or 4-wire line is possible. Simultaneous bidirectional (full duplex) data transmission over one line is not supported except when operating in an HDLC (X.25) network. The maximum line speed is 64K bps for SDLC and 19.2K bps for HDLC, BSC, and Asynchronous (Start/Stop) protocols. Two lines may be attached to each Multi-Protocol Adapter.

	9373	9375	9377
Limitations	None	None	None
Maximum per 9370 processor (3 per #6030)	4	12	36
Cable Order	None	None	None
Prerequisites	#6030 1 slot	#6030 1 slot	#6030 1 slot
Field Installable	Yes	Yes	Yes

Asynchronous Four Line Communications Adapter (#6032): Works with the Communications Processor (#6030) to provide either the Telecommunications Subsystem Controller or the ASCII Subsystem

Controller. Appropriate microcode will be provided based on the communication line characteristics specified. Each adapter card includes the capability of attaching up to 4 ASCII devices via EIA RS-232-C, RS-422-A, CCITT V.24/V.28, CCITT V.11 interfaces respectively. Devices may be attached directly at a distance up to 1,219 Meters (4,000 ft.) or via modems over switched or nonswitched lines. Line speeds from 50 bps to 19,200 bps are supported. Connection to a ROLM CBX is supported through a ROLM DataCom Module (DCM) or through a ROLM Data Terminal Interface (DTI). (ROLM is a registered trademark of the ROLM Corporation) Attachment of ROLM terminals, Cypress, Cedar, and Juniper, is via the ROLM CBX. (Cypress, Cedar, and Juniper are trademarks of the ROLM Corporation.)

	9373	9375	9377
Limitations	None	None	None
Maximum per 9370 processor-ASCII Subsystem (4 per #6030):	4	12	40
Telecommunications Subsystem (3 per #6030):	4	12	36
Cable Order	None	None	None
Prerequisites	#6030 1 slot	#6030 1 slot	#6030 1 slot
Field Installable	Yes	Yes	Yes

IBM Token-Ring Adapter (#6034): Works with the Communications Processor (#6030) to provide system connection to one local area network compatible with the IEEE 802.5 (IBM Token-Ring) standard.

	9373	9375	9377
Limitations	None	None	None
Maximum per 9370 processor	2	4	12
Cable Order	None	None	None
Prerequisites	#6030 1 slot	#6030 1 slot	#6030 1 slot
Field Installable	Yes	Yes	Yes
Note:			

1. Maximum is one per Communications Processor (#6030).

IEEE 802.3 LAN Adapter (#6035): Works with the Communications Processor (#6030) to provide system connection to one local area network compatible with the IEEE 802.3 standard or Ethernet local area network specifications. (Ethernet is a registered trademark of XEROX Corporation.)

	9373	9375	9377
Limitations	None	None	None
Maximum per 9370 Processor	2	4	12
Cable Order	None	None	None
Prerequisites	#6030 1 slot	#6030 1 slot	#6030 1 slot
Field Installable	Yes	Yes	Yes

Note:

1. Maximum is one per Communications Processor (#6030).

MACHINES

DEVICES AND SYSTEMS

The following may be attached to the Telecommunications Subsystem Controller:

IBM Modems

- 3863-1,2; 3864-1,2.; 3865-1,2.; 3868-1,2,3 4
- 5811-20,28; 5812-10,18.; 5821; 5841; 5842; 5865-2,3; 5866-2,3; 5868-52,62

IBM Devices and Control Units

- 3812, 3101, 3725, 3174, 3274
- 3708, 8775, 3161, 3276

IBM Personal Computers

- 5150, 5160, 5170, 5550

IBM Systems

- Series/1, 4331/4361 CA, System/36, System/38, 8100

POWER CONTROL FEATURES

Automated Power Controls (#4000): This feature provides the following functions on the 9370 Processors:

- Remote/External Power-On
- Timed Power-On
- Programmed Power-Off

This feature consists of microcode, cables and connection hardware, and a four-position removable-key lock panel which replaces the normal operator panel on the 9309 Rack Enclosure.

(Except Japan>The customer must also provide an appropriate external modem.<)

The Remote Power-On function allows a modem or other RS-232-compatible electronic device to power-on a 9370 Information System. When signalled, the modem or RS-232-compatible device will activate a control line to initiate the power-on sequence. Entry of a security password through the Remote Operations Facility of the Processor Console is required to complete the Remote Power-On sequence.

The Timed Power-On function allows the 9370 processor to power-on the system at an operator specified time. A clock/calendar with a backup battery is included in the 9370 Processor Console.

The Programmed Power-Off function allows the 9370 processor to power off the system, including the 9370 processor itself, via software control. The VM and VSE operating systems support this function.

The following table describes which power control functions of the 9370 processor are available in each of the four lock positions:

Lock Position:	N	S	M	A	*(F)
Power Control Function:					
Remote Power-On	Yes	No	No	Yes	No
Timed Power-On	Yes	No	No	Yes	No
Programmed Power-Off	Yes	Yes	Yes	Yes	No
Manual Power-On	Yes	No	Yes	No	Yes
Manual Power-Off	No	No	Yes	No	Yes
Manual IPL	No	No	Yes	No	Yes
Automatic Restart after Power Failure	Yes	No	No	Yes	Yes

Lock Position:

N = Normal
S = Secure
M = Manual/Service
A = Automatic Operation

* The column labeled (F) indicates which functions are available when this feature is not installed.

	9373	9375	9377
Limitations	None	None	None
Maximum per IBM 9370 processor	1	1	1
Cable Order	None	None	None
Prerequisites	9309	9309	9309
Field Installable	Yes	Yes	Yes

System/370 Channel Power Control (#6001): The System/370 Channel Power Control Feature sequentially powers on IBM System/370 control units from an 9370 processor. It is a rack-mountable unit containing no external switches or controls. It mounts horizontally in the rear of the 9309 Model 1 Rack Enclosure and requires 2 EIA units of mounting space. On the Model 2 Rack Enclosure it mounts vertically in the recess above the power control compartment. It functions automatically whenever it is plugged into a 9370 processor.

	9373	9375	9377
Limitations	NA	See Note	
Maximum per 9370 processor	NA	1	1
Cable Order	NA	None	None
Prerequisites	NA	#6003	#6003
Field Installable	NA	Yes	Yes

Notes:

1. When the 9370 processor is in the 9309 Model 1 Rack Enclosure, 2 EIA units of mounting space are required.
2. One System/370 Channel Power Control can power up a maximum of sixteen System/370 control units.

MODEL CONVERSIONS

All Model conversions are field-installable by IBM.

9375-40 to 9375-60: The 9375 Model 40 processor can be field-upgraded to an 9375 Model 60 processor. The upgrade consists of card changes and microcode updates.

9375 to 9377: A 9375 system can be converted in the field to an 9377 system. The conversion includes a 9377 Processor with 8MB of main memory and one #5020 I/O Card Unit. One 9309 Rack Enclosure is required and should be added to the conversion order. It will house the new 9377 processor and will be placed adjacent to the rack enclosure which formerly held the 9375 processor.

The new I/O Card Unit will occupy the position the 9375 processor had occupied in the original rack. Device attachment feature cards already installed in the 9375 Processor will be moved to the I/O Card Unit. Depending on the number of these device attachment feature cards in the 9375 Processor being converted, a second I/O Card Unit may be required and must be ordered. If more than 8MB of main memory is required, it also must be ordered.

The Processor Console of the 9375 Processor is retained and will be used with the new 9377 Processor.

For all upgrades, parts removed (including the 9375 processor and main memory) become the property of IBM and must be returned.

Model downgrades are not available.

ACCESSORIES (NONE)

MACHINE ELEMENTS (NONE)

SUPPLIES (NONE)